

PROJECT SPECIFICATION
FOR
CONSTRUCTION OF A [REDACTED]

25X1A

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SPECIFICATION

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SECTION 1

EXCAVATION, FILLING AND BACKFILLING

1-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials not furnished by the Government, and in performing all operations in connection with the excavation, filling and backfilling complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

1-02 APPLICABLE STANDARD: The following standard, of the issue listed below but referred to thereafter by basic designation only, forms a part of this specification:

American Association of State Highway Officials Standard Method:

T 99-49 Standard Laboratory Method of Test for the
 Compaction and Density of Soil

1-03 EXCAVATION:

a. General: The site indicated on the drawings shall be cleared of natural obstructions and existing foundations, pavements, utility lines and other items that would interfere with the construction operations. The excavation shall conform to the dimensions and elevations indicated on the drawings, and shall include trenching for utility systems line, and all work incidental thereto. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services and for inspection, except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces. Undercutting will not be permitted. Suitable excavated material required for fill under slabs shall be separately stockpiled as directed by the Contracting Officer.

b. Drainage: Excavation shall be performed in such manner that the area of the site and the area immediately surrounding the site for a distance of 25 feet, including slopes and ditches, will be continually and effectively drained. Excavation for inlet, outlet and diversion ditches, as necessary, shall be performed under this section.

c. Shoring, including sheet piling, where required during excavation, shall be installed to protect workmen and the banks, adjacent paving, structures and utilities.

d. Protection or removal of utility lines: Existing utility lines that are shown on the drawings of the locations of which are made known to the Contractor prior to excavation and that are to be retained, as well as utility lines constructed during excavation operations, shall be protected from damage during excavation and backfilling and, if damaged, shall be repaired by the Contractor at his expense. Any existing utility lines that are to be retained and are not shown on the drawings or the locations of which are not known to the Contractor in sufficient times to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor, and adjustment in payment will be made in accordance, with the contract. When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time for the necessary measures to be taken to prevent interruption of the service.

e. Excess material from excavation, not required for fill or backfill, shall be wasted where directed by the Contracting Officer and shall be graded. No excavated materials will be wasted without authorization of the Contracting Officer.

f. Topsoil shall be removed, to a depth of 4 inches, from the area within lines 25 feet outside foundation walls, and shall be piled as directed by the Contracting Officer.

g. Blasting: The Contracting Officer shall be the judge as to the necessity for the use of explosives. When rock excavation requires blasting, the Contractor shall exercise care not to overshoot, and shall be required to remove, at his own expense, any material outside the authorized cross-section which may be shattered or loosened by such blasting.

h. Grading: Areas required to be graded shall be constructed true to grade, shall be shaped to drain, and shall be maintained free from extraneous accumulations until inspection has been completed and the work has been accepted.

1-04 FILL: Where concrete slabs are to be placed on earth, any loam or organic or other unsuitable material shall be removed. Fill, where required to raise the subgrade for concrete slabs to the elevations indicated on the drawings shall consist of crushed stone, sand, gravel, or other approved granular material. Fill shall be compacted by a power roller or other approved equipment, and the subgrade brought to a reasonably true and even plane. Crushed stone, sand, gravel or other approved granular material used for fill shall be placed in layers not more than 12 inches thick. Each layer shall be uniformly spread, moistened, or dried as required, and then compacted to 90 percent of maximum density obtained at the optimum moisture content as determined by the A.S.S.H.P. Standard Method T99 with the following modifications:

- a. The mold shall be 6 inches in diameter and 7 inches high. A metal spacer disk 5-15/16 inches in diameter and 2-1/2 inches high shall be used as a false bottom in the mold during compaction.
- b. In lieu of removing all material retained on a No. 4 sieve, all material over 3/4 inch in size shall be removed and replaced with an equal portion of material between 0.18 inch (No. 4 sieve) and 3/4 inch in size.
- c. The weight of the rammer or metal tamper shall be 10 pounds instead of 5.5 pounds, and the tamper shall be dropped from a height of 18 inches instead of 12 inches.
- d. The samples shall be compacted in five layers, each approximately 1 inch thick and each layer receiving 55 blows with the specified tamper.
- e. A separate batch of soil shall be used for each compaction test specimen. No material shall be reused.

1-05 BACKFILLING: After completion of foundation footings, foundation walls, piling, and other construction below the elevation of the final grades, and prior to backfilling, forms shall be removed and the excavation shall be cleaned of trash and debris. Backfill shall consist of approved material from excavation, borrow of sand or gravel, and shall be free of trash, lumber or other debris. Backfill shall be placed in horizontal layers not more than 9 inches thick, and shall have a proper moisture content for the required degree of compaction. Each layer shall be compacted by hand or machine tampers or by other suitable equipment to a density approximating that of the adjacent undisturbed soil. Backfill under concrete floor slabs shall be compacted to the density specified hereinbefore for fill. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage thereof. Backfill shall not be placed against foundation walls prior to 7 days after completion of wall and then only after approval by the Contracting Officer. Backfill shall be brought up evenly on each side of the wall as far as practicable. Heavy equipment for spreading and compacting backfill shall not be operated closer to the wall than a distance equal to the height of the backfill above the top of footing.

SECTION 2

CONCRETE

2-01 SCOPE:

Furnish all plant, labor, equipment, appliances and materials, and in pefform all operations in connection with the installation of concrete work, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

2-02 GENERAL:

Full cooperation shall be given other trades to install embedded items. Suitable templates or instructions, or both, will be provided for setting items not placed in the forms. Embedded items shall have been inspected, and tests for concrete and other materials or mechanical operations shall have been completed and approved before concrete is placed.

2-03 MATERIALS:

a. Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Engineer.

b. Aggregate: Both coarse and fine aggregate, except for gradation, limit of absorption, and sources of materials, shall conform to the requirements of Federal Specification SS-A-281b. Limit of absorption shall not exceed 5 percent. The maximum size of coarse aggregate shall be not larger than one-fifth of the thickness of the member nor larger than three-fourths of the minimum clear spacing between reinforcing bars.

(1) General: Coarse and fine aggregate shall consist of crushed river gravel and screenings, or other approved granular materials of similar characteristics, and shall be composed of hard, tough, durable and uncoated particles. The equipment and plant used in the production of coarse and fine aggregate shall be designed for the aggregate conforming with the requirements of these specifications. Dust shall be removed by adequate washing. The particle shape of the smallest size of crushed coarse and fine aggregate shall be generally rounded or cubical, and the tolerance of flat and elongated particles in all sizes of the coarse and fine aggregate shall be governed by the inherent, placeability requirements of the structure in which the mixture is to be placed. Rock which breaks down into thin, flat, elongated particles, regardless of the type of processing equipment used, will not be approved for use in the production of coarse and fine aggregate. A thin, flat and elongated particle is defined as a particle having a maximum dimension greater than five (5) times the minimum dimension. Aggregate shall not be manufactured from rock which is subject to

weathering or disintegration when exposed to air or moisture nor from rock containing opaline or other active minerals.

(2) Coarse and fine aggregate: Coarse (Type I & V) and fine (Type II & III) aggregate shall be well graded from fine to coarse and shall be within the grading limits shown in the following table:

Table of Grading Limits

Screen Sizes (Inches)	Type I	Percent by Weight Type II	Passing Type III #	Type V
2	100			
1-1/2	95-100			
1	20- 55			100
3/4	0- 15			95-100
1/2				
3/8	0- 5			
No. 4		95-100		20- 55
No. 8		65- 90	100	0- 15
No. 16		45- 70	95-100	0- 5
No. 30		25- 45	40- 70	
No. 50		10- 20	25- 40	
No. 100		2- 8	0- 25	
No. 200	0- 2	0- 4	0- 5	0- 2

Type III aggregates are for mortar and plaster.

d. Anchorage items: Slots and inserts for anchoring masonry and mechanical items to concrete shall be of standard local manufacture, of types required to engaged with the anchors to be provided and installed therein under other sections of these specifications, and shall be subject to approval.

e. Asphalt-saturated felt: Federal Specification HH-F-191, 30-pound.

f. Cement: Only one brand of cement shall be used for exposed concrete in any individual structure. Cement reclaimed from cleaning bags or leaking container shall not be used. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed. Portland cement shall conform to Federal Specification SS-C192b, Type I.

g. Curing materials:

(1) Waterproof paper: Federal Specification UU-P-264a.

(2) Mats: Commercial quality of type best suited to the purpose.

(3) Burlap: Commercial quality.

h. Forms: Wood, metal, structural hardboard, or other approved material that will not adversely affect the surface of the concrete and that will produce or facilitate obtaining specified surface finish of the concrete.

(1) Wood:

(a) Unexposed concrete surfaces: No. 2 Common or better lumber.

(b) Exposed concrete surfaces: Dressed-and-matched boards of uniform thickness, and width not exceeding 10 inches.

(c) Rubbed or smooth surfaces: Plywood or with linings as specified below.

(2) Plywood: Commercial-Standard Luan moisture-resistant, concrete-form plywood, not less than 5-ply and at least 9/16 inch thick.

(3) Metal Forms: Approved type that will produce surfaces equal to those specified for wood forms.

(4) Hardboard forms: A hard-pressed fiberboard conforming to Federal Specification LLL-F-311, especially treated for concreteform use, not less than 1/4-inch thick.

(5) Form lining:

(a) Plywood: Commercial-Standard Luan, concrete-board having a low degree of water absorptivity, not less than 3/16 inch thick, with one smooth side.

i. Form oil: An approved colorless (not darker than ASTM No.3 in accordance with Method 102.5 of Federal Specification VV-L-791d) mineral oil, free from kerosene, with a viscosity of not less than 70 not more than 110 seconds (Saybolt Universal) at 100 F., except that when used on hardboard forms the viscosity shall be not less than 250 seconds at 100 F. Flash point shall be not less than 300°F. (open cup). Viscosity and flash point shall be determined in accordance with methods 304.6 and 1103.5, respectively, of Federal Specification VV-L-791d.

j. Form sealer: Federal Specification TT-W-572.

k. Form ties: Of approved design, fixed or adjustable in length, free of devices that will leave a hole larger than 7/8 inch in diameter in surfaces of concrete, and when used where discoloration of the concrete would be objectionable, metal one inch from the finished surface.

l. Mesh reinforcement: ASTM Standard A 185-54T. except as specified otherwise hereinafter. When indicated in slabs on fill, mesh shall be of the sizes indicated, and gage shall be American steel wire gage.

m. Reinforcement:

(1) Deformed bars: Federal Specification QQ-B-71a. Type B, Grade II, structural grade billet steel, except as otherwise noted on the drawings. Deformations shall conform to ASTM.

(2) Mill reports: Certified copies of mill reports shall accompany deliveries of reinforcing steel, except mesh reinforcement.

n. Water shall be clean, fresh and free from injurious amounts of mineral and organic substances.

o. Cinders shall be clean and well-burned anthracite cinders, containing not less than 90% clinkers.

p. Air-entraining agent: Shall be best local product, either Vinsol or other approved equal brands.

q. White Cement: Shall be conformed to JIS-R-5210.

2-04 SAMPLES AND TESTING:

a. General: Testing of the aggregate, reinforcement, cement and end items shall be the responsibility of the Owner. Samples of concrete for strength tests of end items shall be provided and stored by the Contractor when and as directed.

b. Cement: Cement shall be tested as prescribed in Federal Specification SS-C-192b, and shall be sampled either at the mill or at the site of the work. Tests will be made by or under the supervision of the Contracting Engineer at the expense of the Owner. No cement shall be used until notice has been given by the Contracting Engineer that the test results are satisfactory. Cement which has been stored other than in the bins at the mills, for more than 4 months, after being tested, shall be retested before use. Ordinarily, no cement shall be used until it has satisfactorily passed both the 7 and 28-day tests; but in cases of urgency the Contracting Engineer may waive the 28-day tests and permit the use of cement which has satisfactorily passed the chemical, soundness and 7 days tests, provided it is the product of a quarry and mill which have established a reputation of not less than 3 years' standing for the production of high-grade cement. Any cement delivered at the site of the work and later found under tests to be unsuitable shall be removed from the work and its vicinity.

c. Aggregate: Aggregate shall be tested as prescribed in Federal Specification SS-A-281b. In addition, fine aggregate shall be tested for organic impurities in conformance with ASTM Standard C 40-48.

d. Reinforcement: Reinforcing bars shall be tested as prescribed in Federal Specification QQ-B-71a. Mesh reinforcement shall be tested as prescribed in ASTM Standard A 185-54T.

e. Concrete:

(1) Strength tests during the work: The Contractor shall provide for test purposes one set of three cylinders taken from each 250 cubic yards or fraction thereof, or each day's pour, whichever is less, of each class of concrete placed. Test specimens shall be made and cured in accordance with ASTM Standard C 31-55. Specimens shall be cured under laboratory conditions except that the Contracting Engineer may require curing under field conditions. Cylinders shall be tested in accordance with ASTM Standard C39-49. The test result shall be the average of the strengths of the three cylinders, except that if one specimen in a test shows manifest evidence of improper sampling, molding or testing, the test result shall be the average of the remaining two specimens. If two specimens show such defects, the test shall be discarded. The standard age of tests shall be 28 days, but 7 day tests may be used, with the permission of the Contracting Engineer, provided that the relation between the 7 day and 28 day strengths of the concrete is established by tests for the materials and proportions used. If the average of the strength tests of the laboratory control specimens for any portion of the work falls below the minimum allowable compressive strength at 28 days required for the class of concrete used in that portion, the Contracting Officer shall have the right to order a change in the proportions of the concrete, or both, for the remaining portions of the work, at the Contractor's expenses. If the average strength of the specimens cured on the job falls below the minimum allowable strength, the Contracting Engineer may require changes in the conditions of temperature and moisture necessary to secure the required strength.

(2) Tests of hardened concrete in, or removed from, the structure: Where there is question as to the quality of the concrete in the structure, the Contracting Engineer may require tests in accordance with ASTM Standard C 42-45 or other load tests for that portion of the structure where the questionable concrete has been placed. When required, the load tests shall be made, at the Contractor's expense, in accordance with section 202 of the ACI Building Code (ACI 318). In the event that load tests indicate that concrete placed does not conform to the drawings and these specifications, measures as prescribed by the Contracting Engineer shall be taken to correct the deficiency at no additional cost to the Owner.

2-05 STORAGE:

a. General: Storage accommodations shall be subject to approval and shall afford easy access for inspection and identification of each shipment in accordance with test reports.

b. Cement: Immediately upon receipt at site of work, cement shall be stored in a dry weathertight, properly ventilated structure, with adequate provision for prevention of absorption of moisture.

c. Aggregate: Storage piles of aggregate shall afford good drainage, preclude inclusion of foreign matter, and preserve the gradation.

Sufficient live storage shall be maintained to permit segregation of successive shipments, placement of concrete at required rates, and such procedures as heating, inspection and testing.

2-06 FORMS

a. General: Forms, complete with centering cores and molds, shall be constructed to conform to shape, form, line and grade required, and shall be maintained sufficiently rigid to prevent deformation under load. Studs shall be spaced sufficiently close to prevent deflection of form material and consequent waviness in surfaces of concrete.

b. Design: Joints shall be leakproof and shall be arranged vertically or horizontally to conform to the pattern of design. Forms placed on successive units for continuous surfaces shall be fitted to accurate alignment to assure a smooth completed surface free from irregularities. In spans where intermediate supports are not possible, the anticipated deflection in the forms due to weight of fresh concrete shall be accurately figured and taken into account in the design of the forms, so that finished concrete members will have true surfaces conforming accurately to desired lines, planes and elevations. If adequate foundation for shores cannot be secured, trussed supports shall be provided. Temporary openings shall be arranged in wall and column forms and where otherwise required to facilitate cleaning and inspection. Lumber once used in forms shall have nails withdrawn and surfaces to be exposed to concrete carefully cleaned before reuse. Forms shall be readily removable without hammering or prying against the concrete.

c. Form Ties shall be of suitable design and adequate strength for the purpose. Wire ties will not be permitted where discoloration of the finished surface would be objectionable. Bolts and rods which are to be completely withdrawn shall be coated with grease.

d. Joints: Corners of columns, girders and beams and other exposed joints in more than one plane, unless otherwise indicated on the drawings or directed, shall be beveled, rounded or chamfered by moldings placed in the forms.

e. Coating: Forms for exposed surfaces shall be coated with oil before reinforcement is placed. Surplus oil on form surfaces and any oil on reinforcing steel shall be removed. Forms for surfaces not exposed to view or normal weathering may be thoroughly wet with water in lieu of oiling immediately before placing of concrete. Wood forms for concrete that is to be painted shall be coated with sealer instead of with oil or water. Sealer shall be a water-repellant wood preservative conforming to Federal Specification TT-W-572.

f. Removal: Forms shall be removed only with approval of the Contracting Engineer and in a manner to insure complete safety of the structure after the following conditions have been met. Where the structure as a whole is supported on shores, the beam and girder sides, columns and similar vertical forms may be removed after 24 hours, provided concrete is sufficiently hard not to be injured thereby. Supporting forms or shoring shall to support safety their weight and any construction and/or storage load to which they may be subjected but in no case shall they be removed in less than 6 days, nor shall forms used for curing be removed before expiration of curing period except as hereinafter provided under curing. Care shall be taken to avoid spalling the concrete surface. Wood forms a shall be removed completely from under steps and similar dead spaces, thorough temporary opening if necessary.

(1) Control tests: Results of suitable control tests will be used as evidence that concrete has attained sufficient strength to permit removal of supporting forms. Cylinders required for control tests shall be provided in addition to those otherwise required by this specification. Test specimens shall be removed from molds at the end of 24 hours and stored in the structure as near points of sampling as possible, shall receive insofar as practicable the same protection from the elements during curing as is given these portions of the structure which they represent, and shall not be removed from the structure for transmittal to the laboratory prior to expiration of three-fourths of the proposed period before removal of forms. In general, supporting forms or shoring shall not be removed until strength of control-test specimens has attained a value of at least 1,500 pounds for columns and 2,000 pounds for all other work. Care must be exercised to assure that the newly unsupported portions of the structure are not subjected to heavy construction or material loading.

(2) Clamps: Tie-rod clamps to be removed entirely from the wall shall be loosened 24 hours after concrete is placed, and form ties, except for a sufficient number to hold forms in place, may be removed at that time. Ties wholly withdrawn from walls shall be pulled toward inside face.

(3) Filling tie-rod or bolt holes: Holes left by bolts or tie rods shall be filled soled within 12 hours after removal of forms, with cement mortar blended to match adjacent surface. Holes passing entirely through walls shall be filled from inside faces, using a stops held at the outside wall surface to insure complete filling. Holes which do not pass entirely through walls shall be packed full. Excess mortar at faces of filled holes shall be struck off flush.

2-07 REINFORCING STEEL:

a. General: Reinforcing steel, fabricated to shapes and dimensions shown, shall be placed where indicated on the drawings or required to carry out the intent of drawings and specifications. Before being placed,

reinforcement shall be thoroughly cleaned of rust, mill scale or coating that would reduce or destroy the bond. Reinforcement reduced in section shall not be used. Following any substantial delay in the work, previously placed reinforcement left for future bonding shall be inspected and cleaned. Reinforcement shall not be bent or straightened in a manner injurious to the material. Bars with kinks or bends not shown on drawings shall not be placed. The heating of reinforcement for bending or straightening will be permitted only if the entire operation is approved by the Contracting Engineer. In slabs, beams and girders, reinforcement shall not be spliced at points of maximum stress. Laps or splices shall be of adequate length to transmit stresses and, unless otherwise indicated, shall conform to the table in ACI 315-21. Splices in adjacent bars shall be staggered. Splicers in columns, piers and struts shall be lapped sufficiently to transfer the full stress by bond.

b. Design and details: Unless otherwise indicated on the drawings, the design of reinforced concrete structures shall conform to ACI 318-56 and the details of reinforcing steel shall conform to ACI 315-48. Unless otherwise shown or specified, construction shall conform to the following requirements:

(1) Concrete covering over steel reinforcement shall be not less than the following thicknesses:

Footings and other principal structural members in which concrete is deposited against the ground 3 inches between steel and ground

Where concrete surfaces, after removal of forms, are exposed to weather or ground:
For bars more than 5/8 inch in diameter . . . 2 inches
For bar 5/8 inch or less in diameter . . . 1½ inches

Where surfaces are not directly exposed to weather or ground:
For slabs and walls 3/4 inch
For beams, girders, and tied columns . . . 1½ inches
All covering Equal to diam. of round bars.

Exposed reinforcement bars intended for bonding with future extensions shall be protected from corrosion by concrete or other adequate covering.

(2) Stirrup spacer bars: All stirrups, except ties, shall be held in place by two 3/8-inch spacer bars extending full length of that portion of the beam or girder occupied by stirrups.

(3) Shop drawings: Shop details and placing drawings for all reinforcing steel shall be furnished for approval.

c. Supports: With the exception of temperature reinforcement which shall be tied to main steel approximately 24 inches in center, reinforcement shall be accurately placed and securely tied at all inter-sections and splices with 18-gage black annealed wire, and shall be securely held in position during the placing of concrete by spacers, chairs or other approved supports. Wire-tie ends shall point away from the form. Unless otherwise indicated on the drawings or specified, the number, type and spacing of supports shall conform to the ACI Detailing Manual (ACI 315-21).

2-08 CLASS OF CONCRETE AND USAGE:

a. Strength requirements: Concrete required shall be proportioned and mixed for the following strength:

<u>Class of concrete</u>	<u>Minimum allowable compressive Strength at 28 Days</u>	<u>Usage</u>
A	2,500 psi	All reinforced concrete
B	2,000 psi	All plain concrete

b. Cinder concrete shall be 1 part portland cement ASTM C-150, Type II, 2 parts sand, and 5 parts cinders.

2-09 PROPORTIONING OF CONCRETE MIXES:

a. General: Concrete shall be proportioned by weight.

b. Measurements:

(1) Cement: A one-cubic-foot bag of portland cement will be considered as 94 pounds in weight. In determining the approved mix, portland cement will be used alone as the cementitious material.

(2) Water: One gallon of water will be considered as 8.33 pounds.

(3) Aggregate: Fine and coarse aggregate shall be measured by weight in accordance with Federal Specification AA-A-281b. Coarse aggregate shall be used in the greatest amount consistent with required workability.

(4) AE Agent (Air-entraining Agent): Shall be mixed with concrete at an amount in various with the required strength of the concrete and in accordance with the instructions given by the manufacturer.

c. Corrective additions to remedy deficiencies in aggregate gradations shall be used only with the written approval of the Contracting Engineer. When such additions are permitted, the material shall be measured separately for each batch of concrete.

d. Control: The design of concrete mixture, to meet strength requirements of the class or classes of concrete specified, shall be the responsibility of the Contractor. No substitutions shall be made in the materials used in the work without the approval of the Contracting Engineer. Average cement content and maximum water per bag of cement shall be as follows:

<u>Class of Concrete</u>	<u>Average Cement Content Bag of Cement per Cubic Yard</u>	<u>Maximum Gal of Water Per Bag of Cement</u>
A 2500 pounds per square inch	5.0	6.75
B 2000 pounds per square inch	4.5	7.50

(1) Slump test: Consistency will be determined by the slump test. The slump shall be 3 inches minimum and 3 inches maximum for vibrated concrete. When placing of concrete without vibration is approved, slump shall be from 3 to 6 inches.

(2) Mix proportions: Preliminary mix proportions will be furnished the Contracting Engineer by the Contractor before start of operations. Adjustment will be made by the Contracting Engineer, as required, to determine final proportions which will best satisfy job requirements and use of materials. Subsequent adjustment in these final mix proportions shall be made by the Contracting Engineer as required to compensate for variations in the gradation and moisture content of the aggregates. Necessary revisions in water-cement ratio and concrete mix proportions shall be made as directed.

(3) Workability: The consistency of the mixture will be that required for the specific conditions and methods of placement. The slump shall not exceed that specified above.

(4) Strength tests: The Contracting Engineer will determine the strength of the concrete in the completed work during the progress of construction by test specimens made, cured and tested as specified herein under SAMPLES AND TESTING. Modifications of the design mix, if required, will be made by the Contracting Officer on the basis of the strength of these test specimens. There will be no additional compensation for changing the proportions of the mix to overcome field and aggregate deficiencies or to obtain the specified and characteristics of the concrete. Adjustment in payment will be made for cement more or less than the average bags per cubic yard specified hereinbefore for a given mix.

2-10 MATCHING AND MIXING:

a. Type of plant: The batching plant and mixing equipment shall be as approved by the Contracting Engineer. Either a manual or a semi-automatic plant may be used, subject to the approval of the Contracting Engineer. A manual plant is defined as one in which batch weights are set manually and materials are batched manually. A semi-automatic plant is defined as one in which batching weights are set manually, mixes are changed manually, and materials are batched automatically.

b. Batching plant:

(1) Location: The batching plant may be located on-site or off-site.

(2) Arrangement: Separate bins or compartments shall be provided for fine aggregate, or the different sizes of coarse aggregate, and for bulk cements when used. The compartments shall be of ample size and so constructed that the materials will remain separate under all working conditions. Aggregates may be weighed cumulatively in one weigh batcher on one scale in a manual plant and in a semi-automatic plant may be weighed cumulatively in one weigh batcher on one scale or in separate weigh batchers with individual scales. In a semi-automatic plant, bulk cement shall be weighed on a separate scale in a separate weigh batcher. In a manual plant bulk cement shall be weighed in a separate hopper which may be attached to a separate scale for individual weighing or may be attached to the aggregate hopper for cumulative weighing, provided there are separate beams or dials for cement and aggregates. If cement is weighed on the same scale as the aggregates the cement shall be weighed first and an interlock shall be provided to insure that all hoppers are empty and that the scale is in balance before the weighing of the cement begun. Water may be measured by weight or by volume. In a semi-automatic plant, the batching controls shall be so interlocked that a new batching cycle cannot be started until all batchers are completely empty. The plant shall be so arranged as to facilitate the inspection of all operations at all times. Suitable facilities shall be provided for obtaining representative samples of concrete for uniformity tests. Delivery of materials from the batching equipment shall be within the following limits of accuracy:

Cement	1 percent
Water	1 percent
Aggregate	2 percent

(3) Water batcher: Equipment for batching water shall be provided at the batching plant or included with the mixer, as required for the type or plant used. A suitable water-measuring device shall be provided which will be capable of measuring the mixing water within the specified requirements for each batch. The mechanism for delivering water to the mixers shall be such that leakage will not occur when the valve is closed. The filling and emptying of the water batcher shall be so interlocked that the discharge valve cannot be closed.

when the valves are closed. The filling and discharge valves for the water batcher shall be so interlocked that the discharge valve cannot be opened before the filling valve is fully closed.

(4) Moisture control: A semi-automatic plant shall be capable of ready adjustment for the varying moisture contents of the aggregates and to change the weights of the materials being batched.

(5) Scales: Adequate facilities shall be provided for the accurate measurement and control of each of the materials entering each batch of concrete. The Contractor shall provide standard test weights and any other auxiliary equipment required for the operation of each scale or other measuring device. Periodic tests shall be made in the presence of a Contracting Engineer in such manner and at such intervals as may be directed.

c. Concrete mixers may be stationary mixers, or paving mixers of approved design. The mixers shall have a rated capacity of a least 14 cubic feet of mixed concrete and shall not be charged in excess of the capacity recommended by the Manufacturer. Mixers shall be capable of combining the materials into a uniform mixture and of discharging this mixture without segregation. Stationary and paving mixers shall be provided with an acceptable device to lock the discharge mechanism until the required mixing time has elapsed. The mixers or mixing plant shall include a device for automatically counting the total number of batches of concrete mixed. The mixers shall be operated at the drum speed designated by the manufacturer on the name plate. The mixing periods specified herein are predicated on proper control of the speed of rotation of the mixer drum, and an proper introduction of the materials into the mixer. The mixing time will be increased when such increase is necessary to secure the required uniformity and consistency of the concrete, or when test samples of concrete taken from the front, center and back of the mixer show a difference of more than 10 percent in sand-cement or water-cement ratio. Excessive over-mixing requiring a additions of water will not be permitted. The mixers shall be maintained in satisfactory operating condition, and mixer drums shall be kept free of hardened concrete. Mixer blades shall be replaced when worn down more than 10 percent of their depth. Should any mixer at any time produce unsatisfactory results, its use shall be promptly discontinued until it is repaired.

(1) Stationary mixers: The mixing time for each batch, after all solid materials are in the mixer drum and provided that all of the mixing water is introduced before one-fourth of the mixing time has elapsed, shall be not less than 1 minute for mixers having a capacity of 1 cubic yard; for mixers of larger capacities, the minimum mixing time shall be increased 15 seconds for each addition 1-1/2 cubic yard or fraction thereof of additional concrete mixed. When a stationary mixer is used for partial mixing of the concrete (shrink-mixed) the mixing time in the stationary mixer may be reduced to the minimum necessary to intermingle

the ingredients (about 30 seconds).

2-11 PREPARATION FOR PLACING:

Water shall be removed before concrete is deposited. Any flow of water shall be diverted through proper side drains and shall be removed without washing over freshly deposited concrete. Hardened concrete, debris and foreign materials shall be removed from interior of forms and from inner surfaces of mixing and conveying equipment. Reinforcement shall be secured in position, inspected and approved before curing of concrete. Runways shall be provided for wheeled concrete-handling equipment; such equipment shall not be wheeled over reinforcement nor shall runways be supported on reinforcement.

2-12 PLACING CONCRETE:

a. General: No concrete shall be placed in final position except in the presence of a Contracting Engineer. The use of belt conveyors, chutes or similar equipment will not be permitted without written approval. Concrete shall be handled from mixer or transport vehicle to place of final deposit in a continuous manner, as rapidly as practicable, and without segregation or loss of ingredients until the approved unit of operation is completed. Concrete that has attained its initial set or has contained its mixing water for more than 45 minutes shall not be placed in the work. Placing will not be permitted when, in the opinion of the Contracting Engineer, the sun, heat, wind or limitations of facilities furnished by the Contractor prevent proper finishing and curing of the concrete. Forms or reinforcement shall not be splashed with concrete in advance of pouring. Concrete shall be placed in the forms as nearly as practicable in final position. Immediately after placing, concrete shall be compacted by thoroughly agitating in an approved manner. Tapping or other external vibration of forms will not be permitted. Concrete shall not be placed on concrete sufficiently hard to cause formation of seams and planes of weakness within the section. Concrete shall not be allowed to drop freely more than 5 feet in unexposed work nor more than 3 feet in exposed work. Concrete be receive other construction shall be screeded to the proper level to avoid excessive shimming or grouting.

2-13 COMPACTION:

Concrete shall be compacted by mechanical internal-vibrating equipment supplemented by hand-spading, rodding and tamping as directed. Vibrators shall in no case be used to transport concrete inside forms. Use of form vibrators will not be permitted. Internal vibrators shall maintain a speed of not less than 5,000 impulse per minute when submerged in the concrete. At least one spare vibrator or sufficient parts for repairing vibrators shall be maintained at the site of all times. Duration

of vibration shall be limited to time necessary to produce satisfactory consolidation without causing objectionable segregation and shall be at least 20 seconds per square foot of exposed surface. The vibrator shall not be inserted into lower courses that have begun to set. Where absorptive form lining is used, the vibrator shall not be placed between the forms and the outer row of reinforcement, and in no case shall the vibrator be allowed to touch the absorptive form lining. Vibrators shall be applied at uniformly spaced points not farther apart than the visible effectiveness of the machine.

2-14 BONDING AND GROUTING:

Before depositing new concrete on or against concrete that has set, existing surfaces shall be thoroughly roughened and cleaned of laitance, foreign matter and loose particles. Forms shall be retightened and existing surfaces slushed with a grout coat of neat cement. New concrete shall be placed before the grout has attained initial set. Horizontal construction joints shall be given a brush coat of grout consisting of cement and fine aggregate in the same proportion as concrete to be placed, followed by approximately 3 inches of concrete of regular mix except that the proportion of coarse aggregate shall be reduced 50 percent. Grout for setting column bases, wall plates and other metal items shall be composed of equal parts of sand and portland cement, with water sufficient to produce required consistency.

2-15 FINISHES OF CONCRETE

a. General: Immediately after removal of the forms all fins and loose material shall be removed; honeycomb, aggregate pockets, voids and holes over 1/2 inch in diameter shall be cut out to solid concrete, thoroughly wetted, brush-coated with neat cement grout, and filled with cement mortar composed of 1 part cement to 2 parts fine aggregate. Mortar shall be placed in layers as required, with each layer being thoroughly compacted in places. The final layer shall be finished flush and in the same plane as adjacent surfaces. Patch work shall be damp cured for 72 hours. Exposed patch work shall be rebbed or otherwise treated to match adjacent surfaces.

b. Smooth finish shall, in addition to the above, be given to all concrete surfaces throughout the interior and exterior of the structure, which are exposed to view in finished work or are to be pointed. Smooth finish shall consist in thoroughly wettings and then brush-coating the surfaces with cement grout composed of 1 part cement to 2 parts fine aggregate (by volume) mixed with water to the consistency of thick paint. Grout shall be cork or wood floated to fill all pits, air bubbles, and surface holes. Excess grout shall be scraped off with a trowel and the surface rubbed with burlap to remove any visible grout film.

In hot, dry weather, the grout shall be kept damp by means of fog spray during the setting period. The finish for any area shall be completed in the same day and the limits of a finished area shall be made at natural breaks in the finished surface.

c. Slabs receiving terrazzo finish: The slabs shall be finished to tamping the concrete with special tools, then screeding with straight edges and floating to present a reasonably true and uniform surface, at an elevation sufficiently below the finished surface elevation, as indicated on the drawings, so that when the terrazzo is poured, the finished surface of the terrazzo will be at the elevation indicated on the drawings. The slab shall be wood troweled finished to provide adequate bonding surface.

2-16 CURING:

a. General: Curing shall be accomplished by preventing loss of moisture, rapid temperature change and mechanical injury or injury from rain or flowing water for a period of 7 days when normal portland cement has been used, or 3 day when high-early-strength portland cement has been used. Curing shall be started as soon after placing and finishing as free water has disappeared from the surface of the concrete. Curing of formed undersurfaces shall be accomplished by moist curing with forms in place for the full curing period, or, if forms are removed prior to the end of the curing period, by other means approved by the Contracting Engineer.

b. Moist curing: Unformed surfaces shall be covered with burlap, cotton or other approved fabric mats, or with sand, and shall be kept continually wet. Forms shall be kept continually wet and if removed before the end of the curing period, curing shall be continued as on unformed surfaces. Using suitable materials. Burlap shall be used only on surfaces which will be unexposed in the finished work and shall be in two layers.

SECTION 3

MASONRY

3-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials and in performing all operations in connection with the installation of masonry, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

3-02 MATERIALS:

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where 25X1A equivalent to the materials specified, subject to the approval of the Contracting Engineer.

b. Anchors and ties: Heavily galvanized metal of standard types, subject to approval by the Contracting Engineer; furnish and install as required.

c. Lime: Federal Specification SS-L-351, type M or F, or SS-L-351, type C, pulverized with the further requirement that the total free (unhydrated) calcium oxide (CaO) and magnesium oxide (MgO) in the hydrated produce shall not exceed 8 percent by weight, calculated on the "as received" basis.

d. Reinforcement:

(1) Horizontal reinforcement shall be of electrically welded steel wire not less than No. 8 gage of design shown on drawings.

(2) Vertical reinforcing shall be deformed bars as specified under Section 2, CONCRETE.

e. Sand: ASTM Specification C 144-44

f. Water: Clean and free from injurious amounts of oil, acids, soluble salts, and organic impurities.

g. Cement:

(1) Portland cement: Federal Specification SS-C-192, Type I.

h. Common clay brick: All clay brick shall be best quality, well burned local common red brick, not less than 2" x 9" x 4". No undersized brick, broken brick, brick with spawls or fissures will be allowed. All brick rejected by the Contracting Officer shall be promptly removed from the site.

3-03 SAMPLES:

Before delivery of any material to the site, submit the following samples to Contracting Officer for approval:

Common clay brick 12 units

3-04 HANDLING AND STORAGE:

a. All clay brick shall be handles in such manner as to prevent undue chipping and breakage. Storage piles, stacks or bins shall be so located as to avoid being disturbed or shall be barricaded to protect the materials from damage by construction operation.

b. Cement, lime and any admixture materials, immediately upon delivery to the site, shall be stored in weatherproof sheds, or upon platforms raised free of the ground and effectively protected by tarpaulin covers from exposure to the weather until used. No cementitious or other material that has become caked and hardened from absorption of moisture will be permitted in the work. Bagged cement stored for more than 2 months shall be approved by the Contracting Officer before using.

3-05 PREPARATION AND STORAGE OF LIME PUTTY:

Lime putty shall be made from hydrated lime, or pulverized quick-lime mixed with water to form a stiff, plastic putty. Putty made of hydrated lime, must be stored for more than 24 hours before use in the mortar mix, and precautions taken to protect it from excessive evaporation. Putty made from quicklime shall be passed through a No. 10 sieve and stored for 72 hours prior to use. Store in a manner to prevent undue loss of moisture of heat during slaking period.

3-06 MORTAR MIXING AND PROPORTIONING:

a. General: Use approved type batch mechanical mixer, except that when approved by Contracting Engineer, mortar may be mixed by hand. Mixing time shall be not less than 5 minutes, approximately 2 minutes of which shall be for the mixing of dry materials. Hand-mixing shall be done in a tight mortar-mixing box.

b. Proportioning: Mortar shall be proportioned by volume within the following limit:

Mortar Strength (psi)	Portland Cement	Hydrated Lime or Lime Putty		Aggregate (Damp and Loose)	
		Minimum	Maximum	Minimum	Maximum
1,800	1	1/3	1/2	3-1/4	4

The cement content specified is the minimum. Where the fine aggregate which is locally available or readily obtainable does not produce the specified compressive strength but is in all other respects satisfactory, the fine aggregate content shall be decreased to the extent required to obtain that strength with related density, bonding value and other properties.

c. Measurement: The method of measuring materials for mortar shall be such that the specified proportion of the materials can be controlled and accurately maintained. The weights per cubic foot of the materials shall be considered as follows:

Material	Weight per Cubic Foot (pound)
Portland cement	94
Hydrated lime	40
Quicklime putty	80 (minimum)
Hydrated lime putty	80
Fine aggregate (dry)	80
Fine aggregate (damp)	85

3-07 ERECTION:

A. Brickwork:

a. General: Shall be wetted and allowed to drain and then laid in cement mortar in British bond. All brick shall be laid in full mortar beds with vertical joints slushed full.

b. All brick work shall be laid so as to point to the exterior of the structures in order to provide for a clean and uniform exterior surface.

SECTION 4

CARPENTRY

4-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials and in performing all operation in connection with the installation of carpentry, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

4-02 MATERIALS:

25X1A

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Officer.

b. Lumber shall conform to the requirements of Federal Specifications MM-L-736 and MM-L-751. Any of the [REDACTED] Lumber of the species listed below, or [REDACTED] lumber of species equivalent of the species specified, may be substituted if possessing characteristics as set forth in the applicable grading rules listed in Federal Specifications MM-L-736 and MM-L-851, and if approved by the Contracting Officer. All lumber must be termite treated.

25X1A

25X1A

25X1A

(1) Bucks, frames: Yard Lumber of the grades indicated:

[REDACTED] 1st Grade

(2) Interior trim, shelving and miscellaneous finish:
Factory clean Lumber of Select Yard Lumber of the grades indicated:

25X1A

[REDACTED] 1st Grade
[REDACTED] 1st Grade

(3) Nailers, blocking:

[REDACTED] 2nd Grade
[REDACTED] 2nd Grade

25X1A

(4) Door (plywood and plywood finish): [REDACTED] 1st Grade, use same species throughout.

25X1A

c. Plywood shall conform to Federal Specification NN-P-530 with face veneers as hereinafter specified. 3/8 or 1/2-inch plywood shall have not less than 5 plies, 3/4-inch plywood not less than 7 plies and 1 inch plywood not less than 9 plies.

d. Bolts and nuts shall conform to the requirements of Federal Specification FF-B-571, unless otherwise approved by the Contracting Officer.

e. Calking compound shall conform to the requirements of Federal Specification TT-C-598, Grade I, for gun application wherever practicable.

f. Clamps, expansion bolts, expansion screws, washers and anchors shall be of steel and iron and of standard type and manufacture.

g. Glue shall be case in type and shall conform to the requirements of Federal Specification MMM-A-125.

h. Lag screws shall conform to the requirements of Federal Specification FF-B-561, unless otherwise approved by the Contracting Officer.

i. Nails shall conform to the requirements of Federal Specification F-N-105, or may be the drive-screw or spiral type of standard manufacture.

j. Steel plates and shapes: Items involving steel plates and shapes shall be made of steel conforming to the requirements of Federal Specification QQ-S-741, of the type, grade and class normally used in commercial practice.

k. Steel sheets shall conform to Federal Specification QQ-#636, either hot or cold-rolled, and of the class, condition and finish best suited for the purpose.

l. White lead paste shall conform to the requirements of Federal Specification FF-S-111, unless otherwise approved by the Contracting Officer.

m. Acoustical Units shall be of incombustible composition manufactured from compressed cane fiber. Products of a reputable manufacturer may be used, subject to the approval of the Contracting Officer. Tile shall be of uniform size and thickness, 12" x 1/2" and shall be perforated with beveled edges. Exposed surfaces shall be factory finished with white wash.

25X1A

n. Nails for acoustical units shall be galvanized or zinc coated after manufacture. Nails shall be of sufficient length to securely hold the units in place when countersunk into the perforations as detailed on the drawings.

o. Plastic costed insect metal screens shall be 18 x 18 mesh. Metal screen cloth shall conform to Federal Specification RR-S-141, type II, III to VII, regular wire size, green color.

p. Sashseal: [REDACTED] Sashseal or approved equal. 25X1A

4-03 LUMBER:

a. Grading: Grading of lumber of the various species shall conform to the requirements of Federal Specifications MM-L-746 and MM-L-751, or conform to the grading rules cited in these specifications. Specific requirements for each lumber grade shall be on the basis of density, strength, ring count, number and extensiveness of checks, shakes, splits, knots and gun pockets, amount of wane, cross-granularity, decay, stains and other surface imperfections. The general requirements for lumber grades are here outlined for guidance only, and are not to be construed as being determinant.

(1) Structural grade: Lumber of structural sizes and shape, graded with respect to its strength.

(2) Yard lumber: Lumber classified into sizes, shapes and qualities required for ordinary construction and general purpose use.

(a) Select: Lumber of good appearance and finishing qualities.

1st Grade: Suitable for natural finishes - practically clear.

(b) Common: Lumber not of finishing quality, but suitable for general utility and construction purposes;

1st Grade: Sound, tight-knotted and water-tight.

2nd Grade: Same general character as No.1, but less restricted in quality.

(3) Factory clear lumber, Grade Nos. 1 and 2: Lumber grades with reference to its use for trim, molding and other cuttings. The upper grades containing a high percentage of best quality cuttings - practically clear in wide sizes.

b. Size and pattern: Lumber shall be surfaced four sides and the dressed sizes of yard and structural lumber shall conform to the net sizes shown on the drawings. Lumber shall be worked to such patterns as are indicated on the drawings or specified.

c. Moisture control: Boards and structural lumber not over 2 inches in nominal thickness to be incorporated in the structure, except finish material, shall be air-dried. Moisture content will be established by the Contracting Officer.

d. Storage: Lumber delivered to the site shall be carefully piled off the ground in such manner as to insure proper drainage, ventilation and protection from the weather.

4-04 ANCHORS:

Anchors shall be installed, where specified or shown on the drawings, to anchor carpentry to masonry or concrete. Rough bucks and frames for doors, windows and louvers shall be anchored with straps in masonry and anchor bolts in concrete. Strap shall be 3/16 by 1 1/4 inches, turned up 2 inches at ends. Bolts shall be 5/8-inch and bent as shown. Anchors shall extend not less than 8 inches into concrete, and 12 inches into concrete blocks. Anchors shall be placed near top and bottom of items and not over 3 feet on centers intermediately.

4-05 MISCELLANEOUS ITEMS:

Contractor shall furnish and install all miscellaneous items of rough and finish carpentry, not specifically mentioned in this section of the specifications, but shown on the drawings or required to complete the work. All items shall be constructed as indicated on the drawings and of the best quality or workmanship as accepted in the trade.

4-06 SAMPLES

Samples of the following materials shall be delivered to the Contracting Engineer for test and approval before delivery to the site:

Calking compound	2 pounds
Glue	1 pint each type
Nails, bolts, screws and other anchorages	2 of each kind
Doors	1 of each type
Plywood (each kind)	1 sample, 1 foot
Treated lumber (each kind)	1 piece, 1 foot long
Acoustical tile	3 units
Acoustical tile nails	1/4 pound
Plastic coated insect metal screens	1 piece, 1 yard long

4-07 TREATMENT:

Treatment shall conform to the requirements of Federal Specification TT-W-571, for "Wood Preservative; Recommended Treating Practice".

4-08 Window and screen window frames: Frames in wall shall be made as detailed from the solid stock and shall have three-jamb anchors on each side. Frames shall be set plumb and square, and secured with anchors as detailed.

4-09 Acoustical Treatment: Acoustical units shall be secured by galvanized nails, one nails at each corner of each 12" x 12" unit. Nail heads shall be concealed in the perforations, well below the finished surface of the units. Ceiling units shall be laid out in a square pattern symmetrical about the center lines of each room, space or panel. Units shall not of shimed out from ceiling in order to level them at the proper elevation. Any units requiring such adjustment shall be entirely removed. During erection, the joints around electric outlets, pipes and other work extending through the acoustical treatment shall be sealed tight with plastic calking compound. Following completion of the acoustical treatment, joints shall be straight and true to line, and the exposed surface shall be flush and level. All units shall be tightly butted, and corners shall be full and without worn or broken places. Units shall be neatly jointed to connecting work. The units shall be scribed carefully to the wall at the intersection of ceiling and wall line of each room perimeter.

Following erection, all dirty or discolored surfaces of the acoustical units shall be cleaned and left free from defects. Units which are damaged or improperly applied shall be removed and replaced as directed by the Contracting Officer. One coat of water-base white paint shall be applied to the surface of all acoustical units after installation is complete.

4-10 GROUND:

Dressed wood shall be furnished for securing all wood trim including cabinets and wherever else required. Grounds shall be set rigid, in perfect alignment, and shall be trued with a long straightedge. Grounds shall be $1\frac{1}{2}$ inches wide and of a thickness indicated. Spot grounds for metal flashing shall be set 12 inches on centers, unless otherwise indicated on the drawings. All ground shall be treated lumber.

4-11 DOOR BUCKS:

Masonry and concrete walls and partitions having wood frames shall have bucks of $1\frac{1}{2}$ inch dressed material of width equal to

thickness of partition or wall, unless otherwise indicated. Bucks shall be braced, set straight, true and plumb, and secured with anchors specified hereinbefore.

4-12 DOOR FRAMES:

Frames shall be as shown on the drawings with planted stops. Frames shall be set plumb and square, and secured with finishing nails. Double-wedge blocking shall be driven back of jambs at nailing points, also at backs of butts and lock strikes. Where no bucks are shown wedges shall be tacked lightly to frames, after frames are aligned.

4-13 DOORS

a. General

b. Flush hollow-core doors shall be as indicated on the standard details. The core shall be constructed of cypress. Stiles shall be fitted together with dovetailed joints or by douels and staples, or by any other approved suitable fastenings. The entire core shall be assembled with water-resistant glue and dressed to uniform planes and to a thickness of $\frac{1}{4}$ inch less than the specified thickness of the door. All veneers shall be waterproofed first grade Luan plywood and be bonded with water resistant glue applied to all contact surfaces and the whole door shall be placed in a gluing press which shall apply uniform pressure over the entire surface of the door. The completed door shall be sanded smooth on both faces and edges and all corners shall be rounded to $\frac{1}{32}$ -inch radius.

c. Screen doors shall be constructed to size and design shown on the drawings. Joints of stiles and rails shall be properly formed, tightly fitted, dovetailed, blend-mortised and tenoned, and glued, stiles and rails shall be rabbeted on side to receive the screen. The wire screen cloth shall be stretched taut and secured in place.

d. Glass in wood doors shall be of the size indicated on the drawings. The glass shall be secured to the doors with solid hardwood moldings.

4-14 INSTALLATION OF DOOR FRAMES:

Doors shall be fitted, hung and trimmed as hereinafter specified and as indicated on the drawings. Sashseal shall be used wherever it is necessary. Swinging doors shall have $\frac{1}{16}$ -inch clearance at sides and top, and $\frac{3}{16}$ -inch clearance over thresholds, unless otherwise directed by the Contracting Officer. Doors in openings without thresholds shall have $\frac{3}{8}$ -inch floor clearance. Doors shall be hung and trimmed with hardware conforming to the requirements of

the section on BUILDERS' HARDWARE. All locks with standardized cases shall be installed at the same height. Knob locks and knob latches shall have the center of the knob 43 inches above the finished floor. Cylinder dead lock shall have the center of the cylinder at the same height as the center of the cylinder of knob locks.

4-15 HARDWARE:

Items of hardware specified in BUILDERS' HARDWARE shall be carefully fitted and securely attached. Care shall be exercised not to mar or injure existing work, Upon completion of the work and in the presence of the Contracting Officer, all hardware shall be demonstrated to work freely, all keys shall be fitted into their respective locks, and upon acceptance of the work, all keys shall be tagged and delivered to the Contracting Officer.

4-16 PRIMING:

Millwork, except work to receive stain and natural finish, shall be primed as specified in PAINTING: GENERAL

4-17 INSTALLATION OF THE SCREEN WINDOW

Installation shall include trimming and fitting necessary to make the whole, insect tight.

SECTION 5

TERRAZZO

5-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, and in performing all operations in connection with the installation of terrazzo, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

5-02 GENERAL:

All cutting, drilling, fitting, and the installation of wood grounds and forms required to install the terrazzo and as may be required to prepare the completed terrazzo to receive the work of other trades shall be performed under this section. Terrazzo not otherwise shown or specified, shall have a minimum thickness of $1\frac{1}{2}$ inches from finished surface to concrete surface. The finished surface shall show not less than 70 percent aggregate.

5-03 MATERIALS:

a. Cement: Cement shall be locally made, only one brand of cement shall be used for terrazzo, Cement reclaimed from cleaning bags or leaking container shall not be used. Cement shall conform to Federal Specification SS-C-192b Type 1.

b. Cleaning compound: The compound used for all cleaning of terrazzo shall be an approved neutral chemical cleaner free from acids and strong alkalis or other materials that will affect the color or otherwise damage the terrazzo.

c. Division strips: Division strips where shown shall be formed of half-hard brass and shall be of the size and type indicated on the drawings. Unless otherwise specified, gages for strips shall be Brown and Sharpe.

(1) Standard strips: Standard division strips shall be not less than No. 18 gage. Strips shall be not less than $\frac{3}{4}$ inches in depth, with approved anchoring features for the floor and not less than $1\frac{1}{2}$ -inch in depth for the wainscot

5-01

(2) Base divider strips: Division strips for bases shall conform to the profile of the base, shall be not less than 1/2-inch in depth, and shall be of the same thickness and type as the main division strips. There terrazzo base only is specified, the division strips shall be not less than 18 gage.

d. Edging strips: Edging strips shall be not less than 1/8-inch thick, of the same material as division strips, and shall be provided with a standard form of anchorage having fins of not less than No. 18 Brown and Sharps gage rust-proofed steel.

e. Marble chips: Marble chips shall have an abrasive hardness of a degree satisfactory to the Contracting Officer. Size number 1 chips shall pass a 1/4-inch mesh screen and be retained on a 1/8-inch mesh screen. Size number 2 chips shall pass 2 3/8-inch mesh screen and be retained on a 1/4-inch mesh screen.

f. Sand: Sand shall be clean, silicons masonry sand passing a 1/4-inch screen.

g. Water: Water shall be fresh, clean and free from acid, alkali, sewage, and organic matter.

5-04 SAMPLES:

Before any material is delivered to the site, the following samples shall be submitted to the Contracting Officer for approval.

Terrazzo One 12 by 12 inches panel of
each type specified.
Division strips Two 12 inch lengths of each type.
Edging strips Two 12 inch lengths of each type.
Cleaning compound Two pint can.

5-05 TERRAZZO MIX:

The terrazzo mixes shall be composed by weight as follows:
One part cement and two parts of marble chips of the sizes and colors herein specified.

5-06 PREPARATION FOR TERRAZZO:

a. General: Clean the floor slab, and free from all adhesive compound. Concrete surface to receive terrazzo shall be of a suitable texture to bond to the terrazzo finish, as approved by the Contracting Officer. The surface shall be roughened with a toothed chisel and, prior to laying the terrazzo, shall be cleaned of all dirt, oil, grease and extraneous material.

b. Division strips: Terrazzo floors and wainscots shall be divided by metal strips. The division strips shall be set immediately after the spreading of the underbed, the strips being partially embedded therein, securely anchored to the subfloor and grouted solid. All division strips shall be set straight to lines and to the proper level to ensure that the tops of the strips will show uniformly after grinding and smoothing operations are completed. Each joint and intersection shall be fitted tight. Strips shall be braced to prevent bulging during the placing of the terrazzo.

(1) Floors: Unless otherwise shown on the drawings, or specified, the division in field work of large areas shall be 3 feet by 3 feet, and in small areas shall not exceed 2 feet by 2 feet.

d. Edging strips: Edging strips shall be placed at doorways between terrazzo and other types of flooring and along the edges of all terrazzo bases adjoining other types of floor finishes. The edging strips at doorways shall be placed in line with the stop face of doors. All edging strips shall be anchored and grouted solid in the underbed or to the concrete subfloor and braced to prevent bulging as specified for division strips.

5-07 PLACING TERRAZZO:

a. Floors: The subsurface shall be swept clean thoroughly moistened, but not saturated, and slushed with a coating of neat cement grout approximately 1/16-inch in thickness. The underbed consisting of one part portland cement to 4 parts of coarse-screened sand shall be spread and brought to a level not less than 1/2-inch thick. The dividing strips shall be installed in the green underbed. The terrazzo mix shall be spread, tamped, and rolled into a compact mass not less than 5/8-inch thick. After rolling, additional aggregate mix shall be sprinkled over the surface to fill up all depressions, to take up excess moisture, and to permit the terrazzo to be troweled to a level, dense and even surface, slightly above the finish line of floor. This level shall allow for the surface grinding necessary to expose the specified area of aggregate, and to produce smooth, level floors, free of waves and depressions.

b. Bases: All bases shall be of the terrazzo mix and compositions hereinbefore specified, and shall be poured and tamped into well-braced forms, rodded, and worked so that the aggregate will be well packed against the surface to be exposed in the finished work. The border at doorways shall extend in to the edging strips placed on the stop side of doors as indicated on drawings.

c. Seasoning: The completed terrazzo shall be allowed to season for 6 days during which time it shall be kept moist and free of traffic. The curing shall be accomplished by (1) covering with approximately 1 inch thickness of sand; or (2) covering with building paper or mats; or (3) sprinkling with water at not over one hour intervals.

d. surfacing: Following the curing period, the terrazzo shall be machine-ground to a true even surface using a No. 24 grit followed by a No. 80 grit or finer abrasive stone. After the first grinding, the surface shall be thoroughly grouted with the same cement and color composition as specified for the matrix of the terrazzo mix. The grout shall be of the consistency of thick cream, and shall be brushed over the surfaces to eliminate all imprisoned air and thoroughly fill the surface for final grinding.

e. Finishing: Not less than 72 hours after application, the grouting coat shall be removed by grinding. In the latter stages of grinding, the gritstones or other abrasive used in the grinding machine shall be of a grain or fineness that will give the surface a boned finish. Small areas, inaccessible portions, and corners which cannot be reached by the grinding machine shall be ground and rubbed by hand. The honed surface of finished terrazzo shall show not less than 70 percent of its area in exposed aggregate, evenly distributed, and shall conform in appearance to the approved samples.

5-08 PROTECTION:

The surfaces of the finished work of other trades shall be properly protected from damage and soiling during the process of grinding and washing of the terrazzo. After the finish grinding has been completed and the surface treatment applied, the terrazzo work shall be covered and protected with material approved by the Contracting Officer until the completion of all work by other trades.

5-09 CLEANING AND COATING:

Prior to the placing of the protective covering, or when in the opinion of the Contracting Officer it would be better to do so, after the work of all other trades has been completed and the protective covering removed, the terrazzo work shall be washed with cleaning compound mixed with warm water and, using a fine abrasive as necessary, remove strains or cement smears. The terrazzo shall be allowed to dry thoroughly and shall be given a scaling application of preservative material. The sealing preparation shall be applied in accordance with the manufacturer's directions, leaving all terrazzo work in clean condition meeting the approval of the Contracting Officer.

5-10 PRECAST TERRAZZO:

Precast terrazzo shall be of the terrazzo mix of 1 part cement and 2 parts aggregate and shall be precast to the size as specified on the drawings. The terrazzo mix shall be poured and tamped into well braced forms, rodded, and worked so that the aggregate will be well packed against the surface to be exposed in the finished work. Both faces and all edges shall be ground to the satisfaction of the Contracting Engineer. The outer corners shall be ground to a radius of 1/32-inch. All the seasoning surfacing and finishing shall conform to paragraphs specified in this section. The precast terrazzo shall be anchored on concrete wall with anchor bolts. The wire mesh reinforcement shall be of No. 8 gage wire and be installed in the middle of the terrazzo.

SECTION 6

CALKING

6-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, and in performing all operations in connection with the application of calking, complete, subject to the terms and conditions of the contract, and in strict accordance with this section of the specifications and the applicable drawings.

6-02 WORK NOT INCLUDED:

The section does not include calking occurring in connection with joints in concrete floors, contacts between members of metal doors and metal frames; and roofing and sheet metal work.

6-03 MATERIALS:

25X1A a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Officer.

b. Calking Compound: Calking compound shall conform to the requirements of Federal Specification TT-C-598, grade 1. The color of the calking compound shall match the color of the mortar joints. Delivery of the calking compound to the building site shall be in the manufacturer's original sealed packages.

c. Sealer: The sealer for the joint grooves in masonry shall be of quick-drying liquid, and of a type and consistency recommended by the manufacturer of the calking compound.

d. Rope Yarn: Rope yarn shall be the raveled strands of all fiber free from oil or other staining element.

e. Sashseal: [REDACTED] Sashseal or approved equal.

25X1A

6-04 SAMPLES:

Before the work of application is started, samples of all materials proposed for use shall be submitted to the Contracting Officer for approval.

6-01

6-05 APPLICATION:

a. General: Calking shall be installed in joints around wood or metal frames built into masonry or concrete, and in any other joints so indicated on the drawings and as specified under other sections of these specifications. Calking compound shall be applied by the gun method using nozzles of proper sizes to fit the several widths of the joints. The type of gun shall be subject to approval by the Contracting Engineer.

b. Preparation: Calking in joints shall be a minimum of 3/4-inch in depth and 1/4-inch in width unless otherwise indicated on the drawings. Where adequate grooves for calking have not been provided, grooves shall be prepared by cutting and cleaning out the mortar to the minimum depth and by grinding to the minimum width, taking care that adjoining metal work is not reduced in section. All particles of mortar, dust, and other foreign matter shall be brushed out and just prior to calking, the joint grooves shall be coated with an application of sealer. Where a suitable mortar backstop has not been provided, the back of joint grooves shall be packed tightly with rope yarn.

c. Calking: The compound shall be driven into the joint grooves with sufficient pressure to force out all air and to solidly fill the joint grooves. Calking, where exposed, shall be free of wrinkles, and shall be uniformly smooth. Joints in precast sills and other wash surfaces shall be filled slightly convex to obtain a flush joint when dry. Calking around all openings in masonry shall include the entire perimeter of each opening. Upon completion of the calking, any calked joints not entirely filled shall be roughened and filled as specified and the exposed surface tooled smooth.

d. Cleaning: The surfaces of all materials adjoining calked joints shall be cleaned of any smears of compound or other soiling due to the calking application.

SECTION 7

ROOFING AND WATERPROOFING

7-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, not furnished by the Government, and in performing all operations in connection with the installation of roofing, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

7-02 APPLICABLE PUBLICATIONS:

The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification:

a. Federal Specifications:

R-P-eil Pitch; Coal-Tar (for Mineral-Surfaced
Built-up Roofing, Waterproofing and
Dampproofing

HH-F-185 Felt, Asbestos; Asphalt-Saturated, Uncoated
(for) Flashings, Roofings, and Waterproofing

HH-F-201 Felt, Coal-Tar-Saturated (for) Roofing and
Waterproofing

SS-A-666 Asphalt; (for) Built-Up Roofing, Water-
Proofing, and Dampproofing

SS-A-701 Asphalt-Primer; (for) Roofing and Water-
proofing

SS-C-153 Cement; Bituminous, Plastic

7-03 GENERAL:

Asphalt or tar built-up roofing shall be applied to the roof surfaces indicated on the drawings.

7-01

7-04 MATERIALS:

The following materials shall conform respectively to the specifications and other requirements specified below:

a. Asphalt: Federal Specifications SS-A-566, type, class, and grade best suited to the slope of the roof on which applied, as approved by the Contracting Officer.

b. Asphalt Primer: Federal Specification SS-A-701

c. Bituminous Coating for Sealing: Military Specification MIL-B-10481.

d. Coal-tar Pitch: Federal Specification R-P-381, type I.

e. Felt shall be either the asphalt-saturated or the coal-tar-saturated type and shall conform to the following requirements:

(1) Asphalt-saturated Asbestos Felt: Federal Specification HH-F-185, type I (perforated), class A) 15 - pound).

(2) Coal-tar-saturated Felt: Federal Specification HH-F-201, type I, 15-lb type.

f. Plastic Bituminous Cement: Federal Specification SS-C-153, type I with asphalt-saturated felts and type II with coal-tar-saturated felts.

7-05 MATERIALS STORAGE:

Felts shall be as dry as possible when applied. Felt rolls stored on the job site shall be protected from the weather by being stood on end, not in contact with the ground, and by being stored indoors or completely covered with a heavy waterproof tar-pauling.

7-06 PREPARATION OF SURFACES:

A minimum of 28 days shall elapse between the pouring of the concrete and the application of roofing. No roofing shall be applied until concrete is thoroughly dried, nor shall any roofing be applied while the concrete is wet or damp from rain or dew. Roofing shall be applied at the time specified by the Contracting Engineer, preferably immediately after a warm, dry period. All concrete decks shall be inspected and examined to be sure they are smooth, firm, properly graded to drains, thoroughly

dry, clean and free of all loose material, and have been approved by the Contracting Engineer. They shall then be covered with a good quality of waterproof paper or tarpaulins to protect them from rain and dew until such time as roofing is to be applied. Vents and other projections through roof shall be properly flashed and secured in position, and projecting nails shall be driven firmly home.

7-07 INCLEMENT WEATHER:

The application of roofing materials shall not be commenced when indications of possible showers are present. No roofing shall be done during inclement weather. Temporary coverings on large roofs shall not be removed entirely at commencement of work. Remove coverings only in large enough sections to allow a smooth continuation of the work. In the event of unforeseen showers interrupting the work, all exposed surfaces of the roof and unfinished roofing shall be immediately covered with tarpaulins or waterproof paper. Particular attention shall be given to the protection of exposed and unused felts. Waterproof covering shall be readily accessible at all items during the progress of the work, preferably on the roof itself. Resumption of the work after a rain shall be delayed until all unfinished surfaces are completely and thoroughly dry.

7-08 APPLICATION OF ROOFING:

a. General: Asphalt shall not be heated above 450°F, and coal-tar pitch shall not be heated above 400°F. Rolls of felt shall be stacked in properly protected piles and maintained at a temperature of not lower than 50°F for not less than 24 hours prior to laying. Felt shall be dry when applied. Asphalt and coal-tar pitch shall be hot when applied, and layers of felt shall be laid immediately behind the mop and shall be free from work wrinkles or buckles. As each course of felt is mopped into hot bitumen, the surface of the felts shall be carefully broomed-in with an 18-or 20-inch wide soft-fiber-type floor broom sufficiently to obtain complete adhesion between piles and to close out any air pockets. It is not permissible to mop half the width of sheet and turn back the other half and mop under that portion. Workmen shall not walk on mopped surfaces when the bitumen is in a sticky condition. Coal-tar products only shall be used on roof slopes of less than 3/8 inch per foot. On slopes 3/8 inch per foot and steeper, either coal-tar to asphalt products may be used at the option of the Contractor. Bitumen shall be used as follows: On slopes under 2 inches per foot; type I coal-tar pitch with tarred felts or type II, grade 2, 160°-180°F melting-point asphalt with asphalt-saturated felts; on slopes 2 inches per foot and over; Steep-roofing pitch with tarred felts or type II, grade 2, 180°-200°F melting-point asphalt with asphalt-saturated felts. Each layer of roofing felt shall be carried up abutting vertical surfaces

at least 4 inches or to top of cant strip. All layers of roofing felt at the roof edge shall be carried down into the depression at the edge of the roof deck and secured in place by continuous steel bar of the size shown and in as long sections as practicable. The bar shall be held in place by bolts cast in roof slabs and spaced as indicated. Ears and bolts shall be kept clean and free from corrosion following installation. After the roofing felt is secured in place the entire depression shall be filled with plastic bituminous cement and troweled smooth.

(1) Lapping Felts: Felts for 3-ply built-up roof shall be laid with laps not less than $24\frac{2}{3}$ inches and with starting widths of 12, 24, and 36 inches for felts 36-inch wide. End laps of roofing felts shall be 6 inches.

(2) When mechanical roofing application equipment is used, planks, plywood, or other approved protection shall be placed over roofing. The traffic shall be confined to this protection. Felt machines shall contain a sufficient quantity of bitumen at the proper temperature to insure no dry runs.

b. Standard Roofing Specifications: The following standard specifications establish the minimum requirement for the construction and application of bituminous, built-up roofing:

(1) Type 3ACS, asphalt, built-up, 3-ply roofing on concrete surfaces: The built-up roofing shall consist of not less than the following quantities, in pounds, for each 100 square feet of roof surface:

Asphalt primer	10
3 layers of asphalt-saturated felt . .	45
Asphalt	105

The concrete roof surface shall be coated with asphalt primer, using not less than 10 pounds per 100 square feet. Over the asphalt primer, when dry, channel or spot mopping shall be applied at the rate of not less than 15 pounds per 100 square feet. Channel mopping shall be done in one direction with approximately 6-inch spacing between strips and leaving ends open. Spots in spot mopping shall be spaced uniformly and permitting no closed pockets between. Three layers of asphalt-saturated felt shall be rolled-in immediately after the hot mopping, over the entire roof surface and lapped as specified above. Each sheet of asphalt-saturated felt shall be mopped-in the full width of the lap with hot asphalt, using not less than 30 pounds per 100 square feet for each mopping.

(2) Type 3TCS, tar, built-up, 3-ply roofing on concrete surfaces:

3 layers of coal-tar-saturated felt45
Coal-tar-pitch135

The concrete roof surfaces shall be given a uniform coating of hot coal-tar pitch, using not less than 50 pounds on concrete per 100 square feet. Three layers of coal-tar-saturated felt shall be rolled-in immediately after the hot mopping, over the entire roof surface, and lapped as specified above. Each sheet of coal-tar-saturated felt shall be mopped-in the full width of the lap with hot coal-tar pitch, using not less than 25 pounds per 100 square feet for each mopping.

(3) The concrete roof surfaces shall be given a uniform coating of primer, using not less than 15 pounds of Super Zone Heavy Duty Roof Primer or approved equal on concrete per 100 square feet. Two layers of Super Zone Heavy-Duty Roof Coating or approved equal shall be applied at a rate of not less than 15 pounds per 100 square feet after the concrete surfaces have been set thoroughly. Just pour the Roof Coating on the roof a little at a time, using a long-handled brush to evenly distribute the coating over the entire roof surface.

c. Top Coating: After roofing felts have been laid the entire roof surface shall be coated uniformly with hot asphalt or hot pitch poured on at the rate of not less than 30 pounds and 35 pounds per 100 square foot for asphalt or pitch respectively.

7-09 CINDER CONCRETE TOP WITH MORTAR

After finish 3-ply roofing the surface of asphalt to be covered with 2" cinder concrete with proper slope as indicated. The surface take troweld with cement mortar, moisture curing shall be done at least 3-days after mortar finish.

SECTION 8

PLASTERING

8-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials, and in performing all operations in connection with plastering, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

8-02 MATERIALS:

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable ██████████ manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Officer.

25X1A

b. Lime:

(1) Hydrated lime: Hydrated lime shall conform to the requirements of Federal Specification SS-L-351, type F, with the further requirement that the total free (unhydrated) calcium oxide and magnesium oxide shall not exceed eight (8) percent by weight, calculated on the "as received" basis.

(2) Quicklime (Pulverized): Quicklime shall conform to the requirements of Federal Specification SS-Q-351, type C or type M. Pulverized quicklime shall pass a No. 20 sieve and at least ninety (90) percent shall pass a No. 50 sieve. Only one brand shall be used throughout the work. After slaking to a putty, the pulverized quicklime shall have a plasticity figure of not less than two hundred (200) when tested in accordance with American Society for Testing Materials Tentative Methods of Test C 110-45T, and at the end of seventy-two (72) hours the total free (unhydrated) calcium oxide (CaO) and magnesium oxide (MgO) in the hydrated product shall not exceed eight (8) percent by weight, calculated on the basis of the lime solids in the putty.

c. Lime putty: Lime putty shall be made from hydrated lime, except that quicklime may be used when adequate time and facilities are available for aging. Suitable precautions shall be taken to protect the putty from exposure to the sun and to prevent excessive evaporation when stored. Lime putty prepared from quicklime shall be allowed to cool completely before using. Lime putty shall be prepared as follows:

8-01

(1) Hydrated lime: Hydrated lime shall be mixed with water to form a putty and shall be allowed to stand for at least fifteen (15) minutes before using.

(2) Quicklime (Pulverized): Quicklime shall be slaked in suitable large batches, and with enough water to form a thick cream. During cool or cold weather precautions shall be taken to maintain the heat and prevent premature cooling during the process of hydration. The slaked quicklime shall be passed through a No. 10 sieve and stored for at least seventy-two (72) hours before using. When the use of lump quicklime, slaked on the job, in lieu of pulverized quicklime, is specifically approved for plastering, the cooling and aging period shall be not less than fourteen (14) days.

d. Portland cement: Portland cement shall conform to the requirements of Federal Specifications SS-C-192, type I, or SS-C-208. Only one brand shall be used in the work.

e. Sand: Sand shall conform to the requirements of American Society for Testing Materials Standard C 35-39.

f. Water: Water shall be clean, and free from oils, acids, alkalies, organic or other injurious matter.

8-03 DELIVERY AND STORAGE OF MATERIALS:

All manufactured materials shall be delivered in the original packages, containers, and bundles bearing the name of the manufacturer and the brand. Plaster, cement, and lime shall be stored off the ground under watertight cover, and away from sweating walls and other damp surfaces, until ready for use. Damaged or deteriorated materials shall be removed from the premises.

8-04 MIXING OF PLASTER:

a. General: Plaster shall be mixed in accordance with the printed instruction of the manufacturer. Copies, in duplicate, of the manufacturer's printed instructions shall be submitted to the Contracting Officer. Except when hand-mixing of small batches is specifically approved, mechanical mixture of an approved type shall be used for the mixing of the plaster. Frozen, caked, or lumped materials shall not be used. Mechanical mixers, mixing boxes and tools shall be cleaned after mixing each batch and kept free of plaster from previous mixer. Plaster shall be thoroughly mixed with the proper amount of water until uniform in color and consistency. Retempering will not be permitted, and all plaster which has begun to stiffen shall be discarded.

b. Portland cement plaster: Portland cement plaster for cement base shall be mixed in the following proportions by volume.

One part cement
Three parts sand

If the sand is rather coarse or fine and/or too uniform in size of grains, the proportion of sand given above may be reduced to 2-3/4 parts in the scratch coat.

8-05 APPLICATION:

Properly regulated ventilation shall be provided. Masonry surfaces on which suction must be reduced shall be dampened with a fog spray. Finish coats shall have a reasonably uniform thickness of approximately 1/8 inch, and the minimum thickness at any point shall be 1/16 inch. The thickness of the plaster from the face of the plaster base to the finished plaster surface shall be 1/2-inch thick on the interior faces of exterior walls. The thickness of plaster on asbestos cement board lath shall be 1/2-inch unless otherwise shown. The 1/2-inch plaster shall be 2-coat work.

8-06 SAMPLING:

Samples may be taken from plaster work in place, at any time, by the Contracting Officer. Areas represented by samples which show oversanding will be rejected.

8-07 PATCHING:

Plaster containing cracks, blisters, pits, checks, or discoloration will not be acceptable. Such plaster shall be removed and replaced with plaster conforming to the requirements of this specification and approved by the Contracting Officer. Patching of defective work will be permitted only when approved by the Contracting Officer, and such patching shall match existing work in texture and color.

8-03

SECTION 9

PAINTING9-01. SCOPE

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials, not furnished by the Contracting Officer, and in performing all operations in connection with painting and finishing, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

9-02. GENERAL:

- a. The term "paint", as used herein, includes emulsions, enamels, paints, stains, varnishes and sealers. All paints, accessory materials and colors shall be subject to the approval of the Contracting Officer.
- b. Unless otherwise specified, all ferrous metal, except reinforcing steel, belts, rough hardware and tective paint. Paint shall conform to the requirements of the paragraph on Materials below or an approved equal may be used subject to the approval of the Contracting Engineer. It may be a baked-on shop coat of rust-inhibitive paint of a type standard with the manufacturer, provided such shop coat has proved performance characteristics at least equal to those of the materials specified herein.

9-03. MATERIALS:

- a. General: Paint shall be well-ground, shall not settle badly, cake or thicken in the container, shall be readily broken up with a paddle to a smooth consistency, and shall show easy brushing properties. The paint shall be suitable for spraying when thinned with not more than 12 percent by volume of thinner. All paint materials shall be delivered to the job in original, unbroken containers, with labels and tags intact, and conform to international standards for anti-sulphide paints, and accepted by the Contracting Officer.
- b. Exterior Oil Paint: Exterior oil paint shall conform as stated in Paragraph (a).
- c. Interior Semi-Gloss Enamel: Interior semi-gloss enamel paint shall be wall paint and conform as stated in paragraph (a)
- d. Primer Paint:
 - (1) Exterior Primer Paint: Exterior primer shall conform as stated in paragraph (a).
 - (2) Interior Primer-Sealer Paint: Interior-primer-sealer paint shall conform as stated in paragraph (a).
- e. Color Pigments: Color pigments shall be pure, non-fading and finely ground.

- f. Miscellaneous Paint Materials: The following paint materials shall be the best local products obtainable:

- (1) Putty
- (2) Varnish
- (3) Drier, Liquid
- (4) Linseed Oil
- (5) Thinner
- (6) Turpentine
- (7) Creosote

- g. Exterior Type Paint: Paint for exterior metal shall conform to the requirements of Federal Specification TT-P-86, type IV, paint; Red-Lead-Base; Linseed Oil, Ready Mixed.

9-04. PREPARATION OF SURFACES AND APPLICATION OF PAINT:

a. General:

- (1) Hardware, hardware accessories, plates, lighting fixtures and similar items in place prior to painting, shall be removed during painting operations and repositioned upon completion of each space, or shall be otherwise protected.
- (2) Except as otherwise specified, all surfaces to be painted shall be clean, smooth, dry, and free from dust and grit. All work shall be done in a workmanlike manner, leaving the finished surfaces free from drops, ridges, waves, laps, and brush marks. Paint shall be applied under dry and dust-free conditions.
- (3) Sufficient time shall be allowed between coats to ensure proper drying. Paints shall be thoroughly stirred and kept at a uniform consistency during application and shall not be thinned in excess of the printed directions of the manufacturer. All special directions or specifications of the manufacturer as to surface preparation, application of paint, and equipment thereof, shall be observed and complied with unless otherwise specified herein.
- (4) Where painting on any type of surface has been commenced on any portion of the work, the complete painting operation, including priming and finishing coats, on that portion of the work, shall be completed as soon as practicable, without prolonged delays. Unless otherwise specified, sufficient time shall elapse between successive coats to permit them to dry for recoating and this minimum drying period shall be modified as necessary to suit adverse weather conditions.
- (5) At the time of application of each successive coat, undercoats shall be freed of dust, grease or any foreign matter, which might adversely affect intercoat adhesion, by means of air blast, solvent wiping or other approved means. Paint may be applied by brush.
- (6) Floors and other adjacent areas and installations shall be satisfactorily protected by drop cloths or other precautionary measures.

b. Woodwork:

All millwork and all other woodwork, where required, shall be sandpapered before application of the primer. Small, dry, seasoned knots shall be thoroughly cleaned and scraped, and shall be given a thin coat of orange shallac varnish before the priming coat is applied. Large, open, unseasoned knots and all beads or streaks of pitch shall be heated by a blowtorch and then scraped off, or if the pitch is still soft, it shall be removed with mineral spirits of denatured alcohol. Resulting voids, if any, shall be filled with putty. Nails shall be set. Painting shall proceed only when, in the opinion of the Contracting Officer, the wood is satisfactorily dry.

(1) Priming: All millwork to be painted shall be primed on all sides before installations, with particular attention being given to the sealing of cross-grained surfaces. Woodwork other than millwork shall be primed on exposed surfaces only.

(2) Puttying and Glazing: After the priming coat has been applied, nail holes, cracks, and other depressions shall be filled flush with putty colored to match the finish coat, and sandpapered smooth. Putty shall be dry before subsequent painting.

9-05 EXTERIOR PAINTING:

a. Woodwork: Exterior woodwork shall be painted one coat of exterior primer paint and two finish coats of exterior oil paint. Exterior woodwork shall include all millwork, frames, doors, sash and similar work. Top and bottom edges of doors and screens, after fitting, shall be given two coats of varnish.

b. Metal Work:

Surfaces to be painted shall be cleaned thoroughly of scale, dirt, and rust by the use of steel scrapers, wire brushed, sand blast or other equally suitable tools or methods. Oil and grease shall be removed with benzine or other suitable solvents. Paint shall be kept well stirred while it is being applied. No paint shall be used after it has caked or hardened. Paint shall be well worked into all joints and corners. Paint shall not be applied to damp surface.

9-06. INTERIOR PAINTING AND FINISHING:

a. Wood Surfaces: Wood surfaces, except surfaces to be given natural finish or other finish specified herein, shall be painted one coat or primer-sealer paint followed by two finish coats of interior semi-gloss enamel.

9-07 COLOR:

Color of any painted surface shall be decided by the Contracting Officer.

9-08

CLEANING:

All cloths and cotton waste which might constitute a fire hazard shall be placed in metal containers or destroyed at the end of each work day. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the Contracting Officer. Paint spots, oil, or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable to the Contracting Officer.

9-04

SECTION 10

HARDWARE: BUILDERS'

10-01 SCOPE:

Furnish and install at the project site all builders' hardware complete, as required by the drawings and/or specified hereinafter.

10-02 GENERAL:

Hardware shall conform to the hardware schedule on the drawing.

10-03 HARDWARE TYPES:

a. Butt Hinges:

(1) Butt hinges for doors shall be type [REDACTED] 25X1A
No. 301 or approved equals.

(2) Butt hinges per door . . . 3 unless otherwise
specified.

(3) Butt hinge sizes: All door hinges shall be 5" x 10 holes
unless provided otherwise on the
drawings.

b. Lock and latch sets not furnished by the Owner shall be
supplied complete for a complete installation.

c. Latch shall be of [REDACTED] or approved equal. 25X1A

d. Door closer shall be [REDACTED] or approved equal. 25X1A

e. Stops shall be of [REDACTED] or approved equal. 25X1A

f. Cylinder lock set shall be of Weiser Cat. 500B or A300B or approved
equal, as specified on the drawings.

10-04 SAMPLES AND SCHEDULE:

As soon as practicable after award of contract, a sample of each
of the different items of hardware, properly tagged and marked for identification,

shall be submitted to the Contracting Engineer for approval. Following approval of the samples by the Contracting Engineer, a schedule, showing the quantities, types, catalog numbers, and locations of the various items of builders' hardware required for the project, shall be delivered, in quintuplicate, to the Contracting Officer.

10-05 KEYS:

Supply keys as follows:

Locks 2 keys each

Locks shall be keyed in sets or subsets as directed by Contracting Engineer. The keys of any one set or subset shall not operate the locks of any other set, unless otherwise specified or directed. Keys shall be stamped with the change number. Following installation of the lock, deliver the keys, properly tagged, to Contracting Engineer.

10-06 FINISHES:

a. Regular finishes: When no other finishes are specified herein or in the invitation for bids, brass shall have US3 finish, bright brass; bronze shall have US9 finish, bright bronze.

b. All hardware in toilet shall be chromium or nickel 9-07
Application of Hardware:

All hardware shall be installed in accordance with the instruction given by the manufacturer or the standard practice and as directed by the Contracting Officer.

SECTION 11

MISCELLANEOUS METAL

11-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances and materials, not furnished by the Owner, and in performing all operations in connection with the installation of miscellaneous metal, complete, in strict accordance with this section of the specifications, and subject to the terms and conditions of the contract.

11-02 GENERAL:

All items of miscellaneous metal, which are to be built into the buildings, shall be furnished to the trades concerned to time to avoid delays to construction progress. All accessories or other items essential to complete miscellaneous metal installation, though not specifically shown or specified, shall also be provided. Nails, screws and bolts shall be of the types best suited for the intended purpose, and shall be of a composition that will not support galvanic action in the installation. Standard commercial products which meet the general requirements of the drawings and specifications will be acceptable if details of construction are approved by the Contracting Engineer. All gages unless otherwise noted shall be U.S. Standard.

11-03 SHOP DRAWINGS:

Prior to the installation of any work, all shop drawings which are required by the Contracting Engineer shall be submitted and approval obtained.

11-04 MATERIALS:

25X1A a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers in intended where equivalent to the materials specified, subject to the approval of the Contracting Officer.

b. Galvanized iron and steel shall be copper bearing, conforming to Federal Specification QQ-I-716, class D1. Except as otherwise specified or indicated on the drawings, sheets shall not be lighter than 24 gage.

- c. Solder: Federal Specification QQ-S-571, composition Sn. 50.
- d. Soldering flux not otherwise specified shall be resin, except that for nickel-copper alloy, and where conditions of application prohibit use of resin, flux conforming to Federal Specification O-F-506 shall be used.
- e. Steel shapes: Federal Specification QQ-S-741; type, grade and class as best suited for job intended. All necessary holes and sinkages shall be provided for attaching hardware or other items. Anchorage for attachment to adjoining construction shall be provided.
- f. Steel bars: Federal Specification QQ-B-71.
- h. Brass: Federal Specification QQ-B-626.
 - (1) General: Bolts, nuts, screws, washers, and other fastenings shall be furnished as necessary for the proper erection of the various items of work specified herein. The types and materials of the fastenings shall be suitable for use with the materials which are to be fastened or joined. Fastenings on exterior iron or steel work shall be brass, galvanized steel or other non-rusting types.
 - (2) Steel bolts and nuts: Federal Specification FF-B-571, types and sizes as required.
 - (3) Machine screws: Federal Specification FF-S-91, types I or II, or required sizes.
 - (4) Wood screws: Federal Specification FF-SS-111, flat or round headed of sizes as required.
 - (5) Lead expansion sleeved: Federal Specification FF-H-136, type 4424, of required sizes.
 - (6) Lead anchors: Federal Specification FF-H-136, type 4426, of required sizes.
 - (7) Flat washers: Federal Specification FF-H-136, type 4420 A, galvanized steel of required sizes.
- i. Wire netting: Federal Specification RR-F-221.
- j. Fittings: shall be of galvanized steel plate and with G.I.P. sleeve.
- k. Downspouts: shall be of 4-inch PVC pipe.
- l. Roof Drains: shall be of cast bronze.
- m. Miscellaneous: Materials not specified above shall be as shown on the drawings or as hereinafter specified under the various paragraphs.

11-05 SAMPLES:

All Contractor-furnished materials shall be submitted for approval as required by the Contracting Engineer.

11-06 MISCELLANEOUS:

Anchors, bolts, ties, including steel strap anchors and angles, anchor bolts, expansion bolts, wall ties, jamb anchors for door frames in general, all similar items which are not specifically called for under other sections of the specifications, or which are indicated on the drawings, or are necessary for the proper installation of various parts of the work, shall be provided and installed.

11-07 STEEL SLIDING DOOR: Flush type sliding shall be constructed of one

Flush type sliding shall be constructed of one steel sheet not less than 1/8" thick welded at all edges to reinforcing steel angles and intermediate stiffener steel angles. Door shall be mounted on the track by 2 1/2"Ø and 1"Ø wheel roller bearing trolley with hanger plate as to the connector as specified on the drawing.

- a. Door Frame: shall be constructed of structural steel angles to the size and design indicated.
- b. Astragal: shall be installed in the center edges of the meeting of stiles of the two sliding doors as specified on the drawing.
- c. Welding: Welding in shop and field shall be done by operators who have been previously qualified by tests as prescribed in the American Welding Society "Standard Qualification Procedure" to perform the type of work required. Field welding shall be done by direct current. Surfaces to be welded shall be free from loose scale, rust, grease, paint, and other foreign material except that mill scale which withstands vigorous wire brushing may remain. Joint surfaces shall be free from fins and tears. Finished members shall be true to line and free from twists, bends, and open joints.
- d. Erection: All items shall be installed in prepared openings, to be set plumb, square, level, and at their proper elevation and plane, and located in proper alignment with all work. They shall be securely anchored and ready for operation, and shall be perfect in every respect.
- e. Hardware: Shall be provided and installed as specified on the drawing.
- f. Finish: Door shall be painted as provided in Section on Painting.

SECTION 12
GLASS AND GLAZING

12-01 SCOPE:

This section covers glazing with glass complete.

12-02 MATERIALS:

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Engineer. 25X1A

b. Glass shall conform to Federal Specification DD-G-qualities and thicknesses specified.

c. Putty and glazing compound shall conform to Federal Specification TT-P-781, type I and II, and Federal Specification TT-P-791, Type I and II.

12-03 SAMPLES AND CERTIFICATES:

a. General: Samples and certificates shall be furnished by the contractor at no expense to the Owner.

b. Samples: Not less than 4 different samples, 10 inches by 12 inches in size, of glass of the specified type, class, thickness, and finish, shall be submitted to the Contracting Officer for selection, inspection, and approval prior to delivery of material to the site.

12-04 WORKMANSHIP:

All materials shall be installed in accordance with the contract documents. The installation shall be accomplished by workman skilled in this type of work.

12-05 INSTALLATION:

General: The sizes of glass shown on drawings are approximate. The sizes and proper edge clearances shall be determined by measuring the actual unit to receive the glass. Putty or glazing compound shall be applied thoroughly as a cushion before nailing strip is installed.

Clear sheet glass shall be used except where indicated otherwise. The glass shall be cut and installed with the visible lines or waves running with the horizontal dimensions.

12-06 REPLACEMENT AND CLEANING:

Upon completion of the work, all glass surfaces shall be thoroughly cleaned, with all labels, paint spots, putty, and other defacements removed. Cracked, broken, and imperfect glass shall be replaced at no additional cost to the Owner.

SECTION 13

FINISHING

13-01 SCOPE: The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliance and materials, and in performing all operations in connection with exterior and interior finishing, complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

13-02 MATERIALS:

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Officer. 25X1A

b. Portland Cement: Portland cement shall be conform to the requirements of Federal Specifications SS-C-192, type I, or SS-C-208. Only one brand shall be used in the work.

c. Sand: Sands all conform to the requirements of American Society for Testing Materials Standard C-35-39.

d. Water: Water shall be clean, and free from oils, acids, alkalies, organic or other injurious matter.

e. Granite: Shall be of good quality, sound, free from defects which would impair its strength durability or appearance.

f. Glazed Tile: Glazed tile shall be of a standard product locally available. The size of the tile unit shall be 10.6 cm long 10.6 cm wide and 5 mm thick. The face of the tile shall be onamal glazed and the back of the tile shall be so devised as to bond firmly to the walls.

g. Mosaic Tile: Mosaic tile shall be of a standard product locally available.

h. Glue: Glue for woolly cloth shall refer to the literature data of the manufacturer of the bassian cloth and glass paper.

i. Waterproofing Compound: Shall be local reputable product.

j. White stone powder: Shall have an abrasive hardness of a degree satisfactory to the Contracting Officer.

13-01

13-03 DELIVERY AND STORAGE OF MATERIALS: All manufactured materials shall be delivered in the original packages, containers, and bundles bearing the name of the manufacturer and the brand. Cement shall be stored off the ground under watertight cover, and away from sweating walls and other damp surfaces, until ready for use. Damaged or deteriorated materials shall be removed from the premises.

13-04 SAMPLES: Before any material is delivered to the site, the following samples shall be submitted to the Contracting Officer for approval.

Granite	cover an area approx. 3 ft. x 3 ft.
Glazed tile	12 pieces
Mosaic tile	22 square feet
Woolly cloth	1 yard
Glue	1 pound
White stone powder	1 pound
Silicone	1 pound

13-05 APPLICATION:

a. Glazed tile and mosaic tile: Shall be in accordance with the printed instructions and recommendations of the tile manufacturer approved by the Contracting Officer. All joints shall be tightly laid. The base wall shall be cleaned and damped before laying of the tile.

b. Granite finish: All exposed surfaces shall be polished and rubbed out of wind and free from apparent waves and are approximately plane. Granite shall be brushed clean and drenched immediately before setting and carefully bedded in a full bed of non-staining mortar after curing the surface shall be sprayed a longer of water-proofing compound.

c. Plaster Mixes: One part cement and two parts of white stone powder. The wall must be cleaned and damped before applied of the plaster. Applied plaster mix to the wall to a thickness of not less than 3/4 inch, allow to season for 10 days or as instructed by the Contracting Officer according to the weather condition. Use chisel with constant strength chipping on the dried plaster in a systematic pattern.

13-06 PREPARATION OF CEMENT BED:

Prior to spreading the tile cement bed, the field work shall centered in both directions to permit the pattern to be laid with a

13-06 PREPARATION OF CEMENT BED:

Prior to spreading the tile cement bed, the field work shall be centered in both directions to permit the pattern to be laid with a minimum of cut tile. Walls shall be laid from the center lines outlines outward and adjustments shall be made at the corners.

13-07 APPLICATION OF TILE AND STONE CEMENT BED: The wall surface shall be thoroughly cleaned of all foreign matter and evenly spreading with sufficient tile or stone cement to ensure good bond and even setting without undue waste. Tile or stone cement due to fast drying qualities shall not be spread at any one time to a width greater than that required to lay three width of tile or flag stone.

13-08 CLEANING:

Upon completion of laying tile or flag stone, all surfaces shall be thoroughly cleaned in a manner recommended by the manufacturer so as not to effect the glazed surface of the tile, or to leave any cement mortar on the surface of flag stone.

SECTION 14

ELECTRICAL WORK, INTERIOR

14-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all labor, equipment, supplies, and materials not furnished by the Government, and in performing all operations, necessary for the installation of interior wiring systems, electrical equipment, and electric-service connections, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

14-02 APPLICABLE PUBLICATIONS:

The following specifications, standards, and codes, of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification. Notwithstanding, the use of products of reputable [REDACTED] manufacturers is intended where equivalent to the materials specified, subject to the approval of the Contracting Officer. 25X1A

a. Federal Specifications:

- J-C-129a Cable and Wire; Thermoplastic-Insulated, building-Type (0 to 600-Volt Service)
- W-B-30 Ballast, Fluorescent Lamp
- W-C-586 Conduit Outlets (Cast-Iron, Malleable-Iron, and Cast-Aluminum, with Cover and Accessories-for Shore Use)
- W-C-601a Connectors, Wire; Pressure, Solderless (for Electric Cable and Wire)
- W-F-406 Fittings, Cable and Conduit
- W-L-116 Lamps, Fluorescent
- W-O-821a Outlet-Boxes; Steel, Cadmium - or Zinc-Coated, with Covers and Accessories
- W-R-151a Receptacles (Convenience-Outlets), Adapters, Attachment-Plug-Caps, Cord-Connector-Bodies, Current-Taps, Motor-Base Plugs and Plug Bodies; 250-Volts
- W-S-755 Starter, Fluorescent Lamp

14-01

W-S-893a Switches; Toggle, Multiple-Unit with wall Plates

HH-T-101a Tape, Friction

W-S-896a Switches, Toggle, Single Unit with Wall Plates

b. Military Specification:

MIL-T-7798A Insulation Tape, Electrical, Pressure-Sensitive Adhesive, Plastic

c. National Board of Fire Underwriters' Pamphlet:

No. 70 National Electrical Code - Standard for Electric Wiring and Apparatus. Current Issue

d. National Bureau of Standards Handbook:

H30 National Electrical Safety Code

14-03 GENERAL:

a. Codes and tests: The installations shall conform to the latest applicable rules of the National Electrical Code, and the workmanship shall be of the highest grade. Electrical materials shall be new and approved by the Underwriters' Laboratories, Inc., wherever standards have been established by that agency. In lieu of the Underwriters' Laboratories, Inc., approval, consideration will be given to certified test reports of an adequately equipped recognized independent testing laboratory competent to perform such testing, indicating conformance to all requirements of the applicable Underwriters' Laboratories, Inc., standard. Defective equipment or equipment damaged in the course of installation of test shall be replaced or repaired in a manner meeting with the approval of the Contracting Officer.

b. Arrangement: The contract drawings indicate the extent and general arrangement of the conduit and wiring systems. If any departures from the contract drawings are deemed necessary by the Contractor, details of such departures and the reasons therefor shall be submitted as soon as practicable, and within 30 days after award of the contract, to the Contracting Officer for approval. No such departures shall be made without the prior written approval of the Contracting Officer.

c. Standard Products: Unless otherwise indicated in writing by the Contracting Officer, the materials to be furnished under this specification shall be the standard products of manufacturers regularly engaged in the production of such equipment and shall be the manufacturers' latest standard design that complies with the specification requirements.

d. Materials and equipment schedules: As soon as practicable and within 45 days after the date of notice to proceed and before commencement of installation of any materials or equipment, the Contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of materials, fixtures, and equipment to be incorporated in the work. The list shall include catalog numbers, cuts, diagrams, drawings, and such other descriptive data as may be required by the Contracting Officer. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturers' published ratings. Any materials, fixtures, and equipment listed that are not in accordance with the specification requirements will be rejected.

14-04 GROUNDING:

a. General: The conduit systems and neutral conductor of the wiring system shall be grounded. The ground connection shall be made at the metallic water service. Connection to the water pipe shall be made by a suitable ground clamp or lug connection to a plugged toe. If flanged pipes are encountered, connection shall be made with the lug bolted to the street side of the flange connection. If there is no metallic water service to the building, ground connection shall be made to driven rods on the exterior of the building.

b. Ground rods shall be of copper-clad steel not less than 3/4-inch in diameter, and unless otherwise noted on the drawings shall be 8 feet long, driven full length into the earth. The maximum resistance of a driven ground shall not exceed 25 ohms. If this resistance cannot be obtained with a single rod, a sufficient number of additional rods shall be installed not closer than 6 feet on centers, or if sectional-type rods are used additional sections may be coupled and driven with the first rod, so that the resultant resistance shall be not exceed 25 ohms.

14-05 WIRING METHODS:

a. General: Unless otherwise specified or indicated on drawings, wiring shall consist of insulated conductors installed in rigid zinc-coated conform to Federal specification W-F-406.

b. Conduit and tubing systems: Conduit shall be rigid zinc-coated steel conforming to Federal Specification WW-C-581 and shall be installed in accordance with Article 346 of the National Electrical Code. Tubing shall be zinc-coated electrical metallic tubing conforming to Federal Specification WW-T-806 and shall be installed in accordance with Article 348 of the National Electrical Code. Minimum size of conduit and tubing shall be 1/2-inch. Conduits shall be kept 6 inches away from parallel runs of flues and steam or hot-water pipes. Conduits shall be supported at intervals of not more than 8 feet and shall have runs

installed parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Field-made bends and offsets shall be avoided where possible, but where necessary shall be made with an approved hickey or conduit-bending machine. Changes in direction of runs shall be made with symmetrical bends or cast-metal fittings conforming to Federal Specification W-C-586. Crushed or deformed conduits shall not be installed. Trapped conduits shall be avoided where possible. Care shall be taken to prevent the lodgement of plaster, dirt, or trash in conduits, boxes, fittings, and equipment during the course of construction. Clogged conduits shall be entirely free of obstructions or shall be replaced. Conduits shall be fastened to all sheet metal boxes and cabinets with two locknuts where required by the National Electrical Code, where insulating bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise a single locknut and bushing are acceptable. Bushings shall be installed on the ends of all conduits and shall be of the insulating type where required by the National Electrical Code. Threadless fittings for electrical metallic tubing shall be of a type approved for the conditions encountered; those installed in concrete shall be concrete-tight and those installed in wet locations or exposed to the weather shall be rain-tight. Conduits crossing expansion joints in concrete slabs shall be provided with suitable expansion fittings, or other suitable means shall be provided to compensate for the building expansion and contraction. Wooden plugs inserted in concrete or masonry are not acceptable as a base for conduit fastenings, nor shall conduits or pipe straps be welded to steel structures. Conduits shall be secured by pipe straps or shall be supported by wall brackets, strap hangers, or ceiling trapeze, fastened by wood screws on wood, toggle bolts on hollow masonry units, expansion bolts on concrete or brick, and machine screws or welded threaded studs on steel work. Threaded studs driven in by a powder charge and provided with lock washers and nuts are acceptable in lieu of expansion bolts or machine or wood screws.

c. Conductors in underfloor conduit shall be of copper, rubber- or thermoplastic-insulated unless otherwise specified. Rubber-insulated conductors shall conform to Federal Specification J-C-103, as modified hereinafter. Thermoplastic-insulated conductors shall conform to Federal Specification J-C-129. Wire connectors of insulation material or solderless pressure connectors properly taped shall be utilized for all splices where possible. Solderless pressure connectors shall conform to Federal Specification W-C-601. Soldered mechanical joints insulated with tape shall be kept to a minimum. Rubber and friction tapes shall conform to Federal Specification HH-T-111 and HH-T-101 respectively. Vinyl plastic tape of suitable quality conforming to [REDACTED] is acceptable in lieu of rubber and friction tapes.

25X1A

25X1A

14-06 RECEPTACLES:

a. General: Receptables shall conform to Federal Specification W-R-151.

b. Single and duplex receptacles Single receptacle shall be rated 20 Amperes 250 Volts. duplex receptacles shall be rated 15 amperes, 250 volts. Bodies shall be of brown phenolic compound supported by mounting yoke having plaster ears. Contact arrangement shall be such that contact is made on two sides of an inserted blade. Receptacles shall be side or back wired with two screws per terminal, or shall have pressure-type screwless terminals having suitable conductor-release arrangement.

14-07 WALL SWITCHES:

Wall switches shall be of the totally enclosed tumbler type conforming to Federal Specification W-S-893 or W-S-896. Bodies shall be phenolic compound. Wiring terminals shall be of the screw type or of the solderless pressure type having suitable conductor-release arrangement. Not more than two switches shall be installed in a single-gang position. Switches shall be rated 15-ampere 125-volt for use on alternation current only and shall be suitable for the control of incandescent lamp loads, and inductive loads up to their full rated capacity.

14-08 LAMPS AND LIGHTING FIXTURES:

Lamps and lighting fixtures require as shown on the drawings shall follow hereafter.

a. Lamps of the proper type, wattage, and voltage rating shall be furnished and installed in each fixture.

(1) Fluorescent lamps shall conform to Federal Specification W-L-116 and shall have standard cool white color characteristics.

(2) Lamps shall be delivered to the project in their original cartons and installed in the fixtures just prior to the completion of the project.

b. Fixtures shall conform to the details shown on the drawings which are indicative of the general type desired and are not intended to restrict selection to fixtures of any particular manufacturer. Fixtures of similar designs and equivalent light-distribution and brightness characteristics and having equal finish and quality will be acceptable if approved by the Contracting Officer.

(1) Accessories, such as straps, mounting plates, nipples, or brackets shall be provided for proper installation.

(2) Single unit suspended fluorescent fixtures shall have a twin-stem hanger. Suspended multiple unit or continuous row fluorescent units shall have a tubing or stem for wiring at one point and tubing or rod suspension provided for each unit length of chassis. Rods shall be of not less than 3/16-inch diameter.

(3) Fluorescent industrial-type fixtures shall conform to Federal Specification W-F-331.

(4) Fluorescent lamp auxiliaries shall conform to Federal Specification W-B-30, and Federal Specification W-S-755.

14-09 TESTS:

After the interior-wiring system installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operating in accordance with the requirements of this specification. The test shall be performed in the presence of the Contracting Officer or his authorized representative. The Contractor shall furnish all instruments and personnel required for the tests, and the Government will furnish the necessary electric power. The Contractor shall submit in writing to the Contracting Officer upon completion of the project, the measured ground resistance of each groundrod, indicating the location of the rod, and the resistance and the soil conditions at the time the measurements were made.

14-06

SECTION 15

PLUMBING

15-01 SCOPE:

The work covered by this section of the specifications consists in furnishing all plant, labor, equipment, appliances, and materials, and in performing all operations in connection with the installation of plumbing systems, complete, in strict accordance with this part of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

15-02 GENERAL:

a. Arrangement: The general arrangement of the plumbing system shall be as indicated on the drawings. Detailed drawings of the proposed departures due to actual field conditions or other causes shall be submitted to the Contracting Officer for approval. No such departures shall be made without the prior written approval of the Contracting Officer.

b. Utilities: Water piping shall be connected to be existing water main and all drain lines shall be run to concrete ditch as indicated on the drawings.

c. Connections to equipment and fixtures: The Contractor shall provide necessary material and labor to connect to the plumbing system all fixtures and equipment having plumbing connections. When fixtures and equipment are not delivered prior to final acceptance, the plumbing services shall be capped or plugged at walls or floors as directed, and left ready for future connection.

d. Fittings, valves, accessories: The Contractor shall carefully investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing fittings, valves, and accessories required to meet such conditions.

e. Cutting and repairing: The work shall be carefully laid out in advance, and cutting of construction shall be done only with the written permission of the Contracting Officer. Cutting shall be carefully done, and damage to buildings, piping, wiring, or equipment as a result of cutting for installation shall be repaired by skilled mechanics of the trade involved, at no additional expense to the Government.

15-03 MATERIALS AND EQUIPMENT:

a. General: Quality requirements for materials listed herein are based on U.S. Federal Specifications. However, the use

of products of reputable [REDACTED] manufacturers in intended where 25X1A
equivalent to the materials specified, subject to the approval of
the Contracting Officer.

b. Asphalt varnish: Federal Specification TT-V-51.

c. Fittings:

(1) Cast-iron soil-pipe fittings: Federal Specification
WW-P-401, class A

(2) Drainage fittings: Including floor drain and floor
cleanout, Federal Specification WW-P-491.

(3) Malleable-iron fittings: Federal Specification WW-P-
521, and where connected to zinc-coated piping, type II.

(4) Nipples: Federal Specification WW-N-351, same
material as pipe system where used.

(5) Unions: Federal Specification WW-U-516, WW-U-531, or
WW-F-406, as applicable.

(6) Plumbing fixtures shall be of the local products
and of the best quality. Fixture sizes as shown on the drawings are
for reference only, Contractor shall submit samples to the Contracting
Officer for approval.

(7) Plumbing-fixture-setting-compound shall be of Federal
Specification HH-C-536.

(8) Plumbing-fixture-setting-gaskets shall be of Federal
Specification HH-G-116.

d. Pipe:

(1) Steel Pipe: Federal Specification WW-P-406, Type I.

(2) Wrought-iron Pipe: Federal Specification WW-P-441,
class A, zinc-coated.

e. Valves:

(1) Angle-check, and globe valves: Federal Specification
WW-V-51, class A or B type as suitable for the application; and where
used in connection with copper tubing, modified therefor.

(2) Gate valves: Federal Specification WW-V-54, type I,
II, or III, class A or B; or Federal Specification WW-V-58, type I or
II, class A or B; as applicable; and where used in connection with
copper tubing, modified therefor.

f. Approval of materials and fixtures: As soon as practicable within 30 days after award of contract and before commencement of installation of any materials or fixtures, a complete schedule of the materials proposed for installation shall be submitted for the approval of the Contracting Officer. The schedule shall include catalogue, cuts, diagrams, drawings, and such other descriptive data as may be required by the Contracting Officer. No consideration will be given to partial lists submitted from time to time. Any schedule materials and fixtures not conforming to the specification may be rejected. The Contractor shall furnish a statement giving a complete description of all points wherein the equipment he proposes to furnish does not comply with the specification, as well as any exceptions he may take to the specification. Failure to furnish such a statement will be interpreted to mean that the equipment meets all requirements of the specifications.

15-04 WATER AND DRAIN PIPING:

Water and drain piping shall be galvanized steel or galvanized wrought-iron pipe. Drain fittings shall be drainage pattern. Ruhs of piping shall be installed as indicated on the drawings, pipe shall be cut accurately to measurements established at the building by the Contractor and shall be worked into place without springing or forcing. Care shall be taken not to weaken the structural portions of the building. After cutting and before threading, pipe shall be reamed and shall have burrs removed. Screw joints shall be made with graphite and oil or with an approved graphite compound applied to male threads only. Threads shall be full-cut, and exposed. Calking of threaded joints to stop or prevent leaks will not be permitted. Unions shall be provided where required for disconnection. Changes in pipe sizes shall be made with reducing fittings. The use of long screws and bushings will not be permitted.

15-05 TESTING:

Water piping shall be tested at a hydrostatic pressure of not less than $1\frac{1}{2}$ times of working pressure and proved tight at this pressure for not less than 30 minutes in order to permit the inspection of all joints.

15-06 TRAPS:

Each fixture and piece of equipment requiring connections to the drainage system, except fixtures with continuous waste, shall be equipped with a trap. Traps shall be supplied with fixtures. Each trap shall be placed as near to the fixture as possible and no fixture shall be double-trapped. Traps installed on hub-and-spigot pipe shall be extra-heavy cast-iron. Traps installed on threaded pipe shall be recess drainage pattern.

15-07 HOT WATER STORAGE TANK: 25X1A
25X1A

Storage tank shall conform to [REDACTED], 125 pounds per square inch working pressure, plain steel type and capacity as indicated on the drawings.

15-08 WATER HEATER:

Heater shall be of vertical tube sheet steel coal burning type. Details and capacity as indicated on the drawings. Heater shall be designed for a water-working pressure of 30 pounds per square inch gage, and shall be constructed and equipped in accordance with the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

15-09 FLOOR DRAIN:

Floor drain shall have seepage heads, and separate P-traps, and shall conform to Federal Specification WW-P-541, Figure 106, except as otherwise indicated on the drawings or specified.

15-10 INSULATION:

After the piping has been cleaned and satisfactory tests have been completed, fittings and valves and hot water line shall be covered with plastic material containing not less than 85 percent magnesia or asbestos finished with a hard smooth surface flush with the pipe covering. No union or plated supply branches of any kind shall be covered, and covering shall be neatly terminated in bevels on the ends of unions with plastic material.

15-11 FIXTURE CONNECTIONS:

Where space conditions will not permit the use of standard fittings in conjunction with cast-iron floor flanges, special short-radius fittings shall be provided. Connections between earthenware fixtures and flanges on soil pipe shall be made absolutely gastight and watertight with plumbing-fixture-setting compound or plumbing-fixture-setting gaskets. Rubber gaskets or putty will not be permitted for this connection. Closet bolts shall be not less than 1/4 inch in diameter and shall be equipped with chromium-plated nuts and washers. Fixtures with outlet flanges shall be set at the proper distance from floor or wall to make a first-class joint with the closet-setting compound or gasket and the fixture used. No fixture shall be set in place until the Contracting Officer has examined and approved such flange.

15-04